

Proceedings of the American Academy of Arts and Sciences.

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RECORDS OF MEETINGS, 1901-1902.

**A TABLE OF ATOMIC WEIGHTS. BY THEODORE WILLIAM
RICHARDS.**

REPORT OF THE COUNCIL: BIOGRAPHICAL NOTICES.

AUGUSTUS LOWELL. BY PERCIVAL LOWELL.

TRUMAN HENRY SAFFORD. BY ARTHUR SEARLE.

HORACE ELISHA SCUDDER. BY THOMAS WENTWORTH HIGGINSON.

JOSEPH HENRY THAYER. BY C. H. TOY.

JOHN FISKE. BY ANDREW MCFARLAND DAVIS.

JAMES BRADLEY THAYER. BY JAMES BARR AMES.

OFFICERS AND COMMITTEES FOR 1901-1902.

**LIST OF THE FELLOWS AND FOREIGN HONORARY
MEMBERS.**

STATUTES AND STANDING VOTES.

RUMFORD PREMIUM.

INDEX.

(TITLE PAGE AND TABLE OF CONTENTS.)



RECORDS OF MEETINGS.

Nine hundred and twenty-fifth Meeting.

May 8, 1901. — ANNUAL MEETING.

VICE-PRESIDENT THAYER in the chair.

The Corresponding Secretary read letters from Frank S. Collins, accepting Fellowship; from Franklin P. Mall, acknowledging his election as Associate Fellow; from Vl. Markovnikoff, thanking the Academy for its message of congratulation; from the Johns Hopkins University, announcing the death of Professor Henry A. Rowland; from the Royal Lyncean Academy, of Rome, announcing the death of its President, Professor Angelo Messedaglia; from the Royal Academy of Sciences of Turin, announcing the death of Professor Giulio Bizzozero; from V. Pissaroff, Vice-President of the Ural Society of Natural Sciences of Ekaterinburg, announcing the proposed establishment of an ophthalmological hospital, and asking for gifts of works or instruments; from Arthur MacDonald, of Washington, regarding the establishment of a Psycho-Physical Laboratory in the Department of the Interior; from S. C. Mastick, secretary of the committee on the modification of the Federal legacy tax, announcing that the desired changes have been incorporated in the Statutes of the United States and that the committee has adjourned *sine die*.

The Chair announced the death of William Stubbs, of Oxford, Foreign Honorary Member, in Class III., Section 3.

The Corresponding Secretary presented the Annual Report of the Council.

The Treasurer presented his annual report, of which the following is an abstract: —

GENERAL FUND.

Receipts.

Balance from last year		\$259.50
Investments	\$5,344.80	
Assessments	915.00	
Admission fees	20.00	
Sale of publications	<u>101.01</u>	6,380.81
		<u>6,640.31</u>

Expenditures.

General expenses	\$2,461.49	
Publishing expenses	2,438.82	
Library expenses	1,922.33	
Expenses of moving	<u>5.00</u>	
		\$6,827.64
Balance		<u>187.33</u>
		<u>\$6,640.31</u>

RUMFORD FUND.

Receipts.

Balance from last year		\$1,775.93
Investments	\$2,640.81	
Sale of publications	<u>35.00</u>	2,675.81
		<u>\$4,451.74</u>

Expenditures.

Researches	\$916.00	
Medals	327.00	
Publishing	266.22	
Library	374.44	
Miscellaneous	<u>11.25</u>	1,894.91
Income invested during the year and transferred to capital account		10.75
Balance		<u>2,546.08</u>
		<u>\$4,451.74</u>

WARREN FUND.

Receipts.

Balance from last year	\$994.57
Investments	<u>1,332.97</u>
	\$2,327.54

Expenditures.

Investigations	\$600.00
Income invested during the year and transferred to capital account	<u>451.25</u> \$1,051.25
Balance	<u>1,276.29</u>
	\$2,327.54

BUILDING FUND.

Receipts.

Balance from last year	\$539.52
Investments	<u>783.02</u>
	\$1,322.54

Expenditures.

Income invested during the year and transferred to capital account	\$942.50
Balance	<u>380.04</u>
	\$1,322.54

The following reports were presented:—

REPORT OF THE RUMFORD COMMITTEE.

At the Annual Meeting of the Academy held May 9, 1900, the amount of \$1,000 was put at the disposal of the Rumford Committee for the furtherance of research.

From this sum grants have been made as follows:—

Oct. 10, 1900: Two hundred dollars to Dr. Charles E. Mendenhall, of Williams College, in aid of his investigations upon a hollow bolometer.

Oct. 10, 1900: Five hundred dollars to Professor George E. Hale, of the Yerkes Observatory, in aid of his researches in connection with the application of the radiometer to a study of the infra-red spectrum of the chromosphere.

March 13, 1901: Three hundred dollars to Professor Arthur A. Noyes, of the Massachusetts Institute of Technology, in aid of his research upon the effect of high temperature on the electrical conductivity of aqueous salt solutions.

It was furthermore voted by the Committee at its meeting of April 12, 1901, to recommend to the Academy the appropriation of the sum of five hundred dollars from the income of the Rumford Fund to Professor Theodore W. Richards of Harvard University, in aid of his research upon the Thomson-Joule Free Expansion Experiment, which recommendation was favorably acted upon by the Academy.

The Rumford Committee has given much consideration to the question introduced by Professor E. C. Pickering, of the feasibility of co-operation among the various committees in this country having in charge the administration of funds devoted to research. It was voted by the Committee that the Chairman be authorized to represent the Committee in such consideration of the subject as might be brought about. Several entirely informal conferences have taken place among representatives of such committees, and it is hoped that some general understanding may be reached which will be helpful to those engaged in research.

The following recommendations have been voted by the Committee, and are now presented to the Academy for its consideration.

Oct. 10, 1900, it was voted that the Committee recommend to the Academy the appropriation of one hundred dollars from the income of the Rumford Fund to aid in the cataloguing of the books in the Academy Library.

March 13, 1901, it was voted to recommend to the Academy that a replica in bronze of each Rumford Medal hereafter awarded by the Academy be struck off and preserved in the Hall of the Academy.

April 12, 1901, it was voted that the Committee recommend to the Academy the appropriation of one hundred and fifty dollars from the income of the Rumford Fund for the purchase and binding of the usual periodicals for the current fiscal year.

At the same meeting it was voted that the Committee recommend to the Academy the appropriation of the sum of one hundred and fifty dollars from the income of the Rumford Fund for the purchase and binding of books on light and heat, said works to be purchased upon the recommendation of the Rumford Committee.

At the same meeting it was furthermore voted that the Chairman of the Committee recommend to the Academy the appropriation from the income of the Rumford Fund of one thousand dollars for the immediate needs of the Committee in the furtherance of research.

A wish has frequently been expressed for a complete list of persons to whom the Rumford Premium has been awarded, and to meet this desire such a list is appended to the present report.

Papers embodying the results of researches conducted wholly or in part by the aid of grants from the Rumford Fund as follows have been printed during the past year in the Proceedings of the Academy.

"On the Thermal Diffusivities of Different Kinds of Marble," by B. O. Peirce and R. W. Willson.

"On the Thermal and Electrical Conductivity of Soft Iron," by Edwin H. Hall.

"False Spectra from the Rowland Concave Grating," by Theodore Lyman.

"A Study of Growing Crystals by Instantaneous Photomicrography," by Theodore W. Richards and Ebenezer H. Archibald.

In accordance with a vote of the Committee passed Nov. 10, 1897, all persons receiving grants from the Rumford Fund are expected to present an annual report of the progress of their work. In response to the usual request such reports have been received from the following persons, regarding their several researches as stated below:—

Mr. Arthur L. Clark, on the molecular properties of vapors in the neighborhood of the critical point.

Professor Henry Crew with Mr. O. H. Basquier, on electric arc spectra.

Professor Edwin B. Frost, on the spectroscopic determination of the radial velocities of stars.

Professor Edwin H. Hall, on the thermal properties of iron.

Professor George E. Hale, on the application of the radiometer to the study of the infra-red spectrum.

Professor Frank A. Laws, on the thermal conductivity of metals.

Professor Edward L. Nichols, on the visible radiation from carbon, accompanied by a paper for presentation to the Academy embodying the result of his researches.

Mr. C. E. Mendenhall, on the hollow bolometer.

Professor Edward C. Pickering, on the determination of the light of very faint stars.

Professor Theodore W. Richards, on (a) the photographic study of growing crystals; (b) the transition temperatures of salts as fixed points in thermometry; (c) the experimental study of the Joule-Thomson Effect.

Professor Wallace C. Sabine with Mr. Theodore Lyman, on the study of false spectra from the Rowland Concave Grating.

The Committee has devoted much time to the consideration of the desirability of an award of the Rumford Premium. The claims of several meritorious candidates have been investigated and discussed at length. As a result of these deliberations the Committee voted unanimously on Feb. 13, 1901, for the first time, and on March 13, 1901, for the second time, that the Academy be recommended to award the Rumford Premium to Elihu Thomson for his inventions in electric welding and lighting.

CHAS. R. CROSS, *Chairman*.

Awards of the Rumford Premium.

- May 28, 1839. ROBERT HARE, of Philadelphia, for his invention of the compound or oxyhydrogen blowpipe.
- June 1, 1862. JOHN ERICSSON, of New York, for his improvements in the management of heat, particularly as shown in his caloric engine of 1855.
- May 30, 1865. DANIEL TREADWELL, of Cambridge, for improvements in the management of heat, embodied in his investigations and inventions relating to the construction of cannon of large calibre, and of great strength and endurance. Presented November 14, 1865.
- June 12, 1866. ALVAN CLARK, of Cambridge, for his improvements in the manufacture of refracting telescopes as exhibited in his method of local correction. Presented February 26, 1887.
- May 25, 1869. GEORGE HENRY CORLISS, of Providence, for his improvements in the steam engine. Presented January 11, 1870.
- June 6, 1871. JOSEPH HARRISON, Jr., of Philadelphia, for his mode of constructing steam-boilers, by which great safety has been secured. Presented January 9, 1872.
- May 27, 1873. LEWIS MORRIS RUTHERFORD, of New York, for his improvements in the processes and methods of astronomical photography. Presented March 10, 1874.
- May 25, 1875. JOHN WILLIAM DRAPER, of New York, for his researches on radiant energy. Presented March 8, 1876.
- May 25, 1880. JOSIAH WILLARD GIBBS, of New Haven, for his researches in thermodynamics. Presented January 12, 1881.
- May 29, 1883. HENRY AUGUSTUS ROWLAND, of Baltimore, for his researches in light and heat. Presented February 14, 1884.

- May 25, 1886. SAMUEL PIERPONT LANGLEY, of Allegheny, for his researches in radiant energy. Presented May 11, 1888.
- May 29, 1888. ALBERT ABRAHAM MICHELSON, of Cleveland, for his determination of the velocity of light, for his researches upon the motion of the luminiferous ether, and for his work on the absolute determination of the wave-lengths of light. Presented April 10, 1889.
- May 26, 1891. EDWARD CHARLES PICKERING, of Cambridge, for his work on the photometry of the stars and upon stellar spectra. Presented January 13, 1892.
- May 8, 1895. THOMAS ALVA EDISON, of Orange, N. J., for his investigations in electric lighting. Presented May 13, 1896.
- May 11, 1898. JAMES EDWARD KEELER, of Allegheny, for his application of the spectroscope to astronomical problems, and especially for his investigations of the proper motions of the nebulae, and the physical constitution of the rings of the planet Saturn, by the use of that instrument. Presented June 14, 1899.
- May 10, 1899. CHARLES FRANCIS BRUSH, of Cleveland, for the practical development of electric arc lighting. Presented March 14, 1900.
- May 9, 1900. CARL BARUS, of Providence, for his various researches in heat.

REPORT OF THE C. M. WARREN COMMITTEE.

The C. M. Warren Committee recommends to the Academy the following appropriations from the income of the C. M. Warren Fund:—

To Professor C. F. Mabery, Case School of Applied Science, Cleveland, Ohio, four hundred dollars for use in his researches on petroleum.

To Professor A. A. Noyes, Massachusetts Institute of Technology, three hundred dollars for use in his investigation of a systematic procedure for the qualitative analysis of the rare metals.

To Professor Charles H. Herty, Athens, Georgia, one hundred and forty-five dollars for use in his research on platinum and allied metals.

C. L. JACKSON, *Chairman*.

REPORT OF THE COMMITTEE OF PUBLICATION.

The Publishing Committee begs leave to report that there have been issued during the last academic year five numbers of Volume XXXV. of the Proceedings and the first twenty-eight numbers of Volume XXXVI., aggregating 719 pages and 11 plates. Besides this a small edition of Volume XXXIV. was reprinted, at a cost of \$180, to replace losses by

fire in the bindery. Four numbers of the current Proceedings (62 pages and 4 plates) were printed at the cost of the Rumford Fund (\$266.22). The total expenditure for printing falling on the General Fund was \$2438.82. The appropriation was \$2400, and the return from sales \$101.01, leaving an unexpended balance of \$62.19. The Committee recommends for the coming year an appropriation of \$2400, the same as in the last.

For the Committee,

SAMUEL H. SCUDDER, *Chairman*.

REPORT OF THE COMMITTEE ON THE LIBRARY.

The two most important matters relating to the Library have been the installation of a steel stack for folios by the Massachusetts Historical Society, on the same terms as the other stacks were furnished, and the commencement of a new card catalogue of subjects and authors, for which \$200 was appropriated last year. About 1300 cards, covering nearly the whole of the works on mathematics and astronomy, have been typewritten at a total cost of \$70.62.

The reappropriation of \$100 and an appropriation of \$100 from the income of the Rumford Fund is requested to continue this work and to purchase a catalogue case.

The accessions during the year have been as follows:

	Vols.	Parts of vols.	Pams.	Maps.	Total
By gift and exchange	473	2027	296	5	2798
By purchase — General Fund .	28	717			745
By purchase — Rumford Fund .	36	340			376
Total	537	3084	296	5	3919

Last year the total number of accessions was 3224.

28 volumes and 717 parts of volumes were bought with the appropriation from the income of the General Fund at an expense of \$339.52; 340 parts of volumes were bought with the appropriation from the income of the Rumford Fund for \$101.48; 36 volumes of the "Fortschritte der Physik," needed to complete the set to date, for which a special appropriation was made from the income of the Rumford Fund, have been purchased at an expense of \$202.66; 698 volumes were bound at an expense of \$925.41, of which \$861.11 was charged to the General Fund and \$64.30 to the Rumford Fund.

A. LAWRENCE ROTCH,

Librarian and Chairman of the Committee on Library.

On the recommendation of the Rumford Committee, it was

Voted, To appropriate from the income of the Rumford Fund —

One hundred dollars (\$100) to aid in the cataloguing of the books in the Academy Library.

One hundred and fifty dollars (\$150) for the purchase and binding of periodicals.

One hundred and fifty dollars (\$150) for the purchase and binding of books on light and heat, said works to be purchased upon the recommendation of the Rumford Committee.

One thousand dollars (\$1000) for the immediate needs of the Committee in the furtherance of research.

Voted, That a replica in bronze of each Rumford Medal hereafter awarded be struck off and preserved in the Hall of the Academy.

Voted, To award the Rumford Premium to Elihu Thomson for his inventions in electric welding and lighting.

On the recommendation of the C. M. Warren Committee, it was

Voted, To appropriate from the income of the C. M. Warren Fund —

Four hundred dollars (\$400) to Professor C. F. Mabery, of Cleveland, Ohio, for use in his researches on petroleum.

Three hundred dollars (\$300) to Professor A. A. Noyes, of Boston, for use in his investigation of a systematic procedure for the qualitative analysis of the rare metals.

One hundred and forty-five dollars (\$145) to Professor Charles H. Herty, of Athens, Georgia, for use in his research on platinum and allied metals.

On the recommendation of the Committee on Publication, it was

Voted, To appropriate from the income of the General Fund twenty-four hundred dollars (\$2400) for publications.

On the recommendation of the Committee on the Library, it was

Voted, To appropriate from the income of the General Fund one hundred dollars (\$100) to continue the catalogue of the Library and to purchase a catalogue-case.

On the recommendation of the Committee of Finance, it was
Voted, To appropriate from the income of the General Fund two thousand dollars (\$2000) for general expenses.

Voted, That the assessment for the ensuing year be five dollars.

On the recommendation of the committee to whom certain alterations of the Statutes were referred at the meeting of December 12, 1900, it was

Voted, To amend the Statutes as follows : —

Ch. I., Sec. 1, first sentence. "The Academy consists of Resident Fellows, Associate Fellows, and Foreign Honorary Members."

Ch. I., Sec. 2. "The number of Resident Fellows shall not exceed two hundred. Only residents in the Commonwealth of Massachusetts shall be eligible to election as Resident Fellows, but resident fellowship may be retained after removal from the Commonwealth. Each Resident Fellow shall pay an admission fee of ten dollars and such annual assessment, not exceeding ten dollars, as shall be voted by the Academy at each annual meeting. Resident Fellows only may vote at the meetings of the Academy."

Ch. I., Sec. 3. "The number of Associate Fellows shall not exceed one hundred, of whom there shall not be more than forty in either of the three classes of the Academy. Associate Fellows shall be chosen from persons residing outside of the Commonwealth of Massachusetts. They shall not be liable to the payment of any fees or annual dues, but on removing within the Commonwealth they may be transferred by the Council to resident fellowship as vacancies there occur."

Ch. I., Sec. 4. Omit "And" at the beginning of last sentence.

Ch. II., Sec. 2, first sentence. "At the Annual Meeting of 1901, nine Councillors shall be elected by ballot, one from each class of the Academy to serve for one year, one from each class for two years, and one from each class for three years; and at annual meetings thereafter three Councillors shall be elected in the same manner, one from each class, to serve for three years; but the same Fellow shall not be eligible for two successive terms."

Ch. II., Sec. 2, second sentence. Change "These" to "The." At end of this sentence add: "Five members shall constitute a quorum."

Ch. V., Sec. 5. "The Committee of Publication, of three Fellows, one from each Class, to whom all communications submitted to the Academy for publication shall be referred, and to whom the printing of the Memoirs and the Proceedings shall be intrusted."

Ch. V., Sec. 6. "The Committee on the Library, of the Librarian *ex officio*, and three other Fellows, one from each Class, who shall examine the Library and make an annual report on its condition and management."

Ch. VI., Sec. 1. Omit the second sentence.

Ch. VI., Sec. 2, third sentence. "He shall notify the meetings of the Academy, apprise officers and committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy."

Ch. VI., Sec. 3. "The two Secretaries, with the Chairman of the Committee of Publication, shall have authority to publish such of the records of the meetings of the Academy as may seem to them calculated to promote its interests."

Ch. VII., Sec. 2. Omit the words "by order of the President or presiding officer."

Ch. VII., Sec. 3. "The Treasurer shall keep separate accounts of the income and appropriation of the Rumford Fund and of other special funds, and report the same annually."

Ch. VII., Sec. 4. Omit the words "on such securities as the Academy shall direct."

Ch. VIII., Sec. 1. "It shall be the duty of the Librarian to take charge of the books, to keep a catalogue of them, to provide for the delivery of books from the Library, and to appoint such agents for these purposes as he may think necessary. He shall make an annual report on the condition of the Library."

Ch. VIII., Sec. 2. "The Librarian, in conjunction with the Committee on the Library, shall have authority to expend such sums as may be appropriated, either from the General or Special Funds of the Academy, for the purchase of books and for defraying other necessary expenses connected with the Library."

Ch. VIII., Sec. 3. "To all books procured from the income of the Rumford Fund, or other special funds, the Librarian shall cause a stamp or label to be affixed, expressing the fact that they were so procured."

Ch. VIII., Sec. 5. Omit "And" at beginning of second sentence.

Ch. VIII., Sec. 7. "The Librarian shall have custody of the Publications of the Academy and shall distribute copies among the Associate Fellows and Foreign Honorary Members at their request. With the advice and consent of the President, he may effect exchanges with other associations."

Ch. X., Sec. 2, first sentence. "Candidates for election as Resident

Fellows must be proposed by two Resident Fellows of the section to which the proposal is made, in a recommendation signed by them, and this recommendation shall be transmitted to the Corresponding Secretary, and by him referred to the Council for nomination."

Ch. X., Sec. 2, second sentence. Change "seven" to "five."

Ch. X., Sec. 3. Abbreviate first sentence, as follows: "The nomination and election of Associate Fellows may take place in the manner prescribed in reference to Resident Fellows."

Ch. X., Sec. 6. Change first word ("each") to "a majority of any."

Under Rumford Premium, change "a gold and silver medal" to "a gold and a silver medal."

The annual election resulted in the choice of the following officers and committees for the academic year 1901-02:—

ALEXANDER AGASSIZ, *President*.

JOHN TROWBRIDGE, *Vice-President for Class I.*

ALPHEUS HYATT, *Vice-President for Class II.*

JAMES B. THAYER, *Vice-President for Class III.*

WILLIAM M. DAVIS, *Corresponding Secretary.*

WILLIAM WATSON, *Recording Secretary.*

FRANCIS BLAKE, *Treasurer.*

A. LAWRENCE ROTCH, *Librarian.*

Councillors.

HARRY M. GOODWIN, for one year.	} Class I.
CHARLES R. SANGER, for two years.	
GEORGE F. SWAIN, for three years.	
GEORGE H. PARKER, for one year.	} Class II.
THEOBALD SMITH, for two years.	
ROBERT DEC. WARD, for three years.	
WILLIAM EVERETT, for one year.	} Class III.
A. LAWRENCE LOWELL, for two years.	
DENMAN W. ROSS, for three years.	

Member of Committee of Finance.

ELIOT C. CLARKE.

Rumford Committee.

ERASMUS D. LEAVITT, AMOS E. DOLBEAR,
 EDWARD C. PICKERING, ARTHUR G. WEBSTER,
 CHARLES R. CROSS, THEODORE W. RICHARDS,
 THOMAS C. MENDENHALL.

C. M. Warren Committee.

CHARLES L. JACKSON, LEONARD P. KINNICUTT,
 SAMUEL CABOT, ARTHUR M. COMEY,
 HENRY B. HILL, ROBERT H. RICHARDS,
 HENRY P. TALBOT.

The Chair appointed the following standing committees : —

Committee of Publication.

SAMUEL H. SCUDDER, SETH C. CHANDLER,
 CRAWFORD H. TOY.

Committee on the Library.

HENRY W. HAYNES, SAMUEL HENSHAW.
 THEODORE W. RICHARDS.

Auditing Committee.

HENRY G. DENNY, WILLIAM L. RICHARDSON.

The following gentlemen were elected members of the Academy : —

George Frisbie Hoar, of Worcester, as Resident Fellow in Class III., Section 1 (Philosophy and Jurisprudence).

John Fritz, of Bethlehem, Pennsylvania, as Associate Fellow in Class I., Section 4 (Technology and Engineering).

Thomas Chrowder Chamberlin, of Chicago, as Associate Fellow in Class II., Section 1 (Geology, Mineralogy, and Physics of the Globe), in place of the late George Mercer Dawson.

Ferdinand Freiherr von Richthofen, of Berlin, as Foreign Honorary Member in Class II., Section 1 (Geology, Mineralogy, and Physics of the Globe).

Adolph Engler, of Berlin, as Foreign Honorary Member in

Class II., Section 2 (Botany), in place of the late Jacob Georg Agardh.

Angelo Celli, of Rome, as Foreign Honorary Member in Class II., Section 4 (Medicine and Surgery).

Gaston Paris, of Paris, as Foreign Honorary Member in Class III., Section 4, in place of the late Charles Jacques Victor Albert, Duc de Broglie.

The Treasurer proposed an amendment to Chapter V., Section 2, of the Statutes. This proposition was referred to a committee consisting of the Treasurer and James B. Ames.

James B. Thayer read an obituary notice of John E. Hudson.

Clarence J. Blake read an obituary notice of his father, John H. Blake, and F. W. Putnam gave an account of the archaeological work of Mr. Blake.

The following papers were presented by title:—

"On Ruled Loci in n -Fold Space." By Halcott C. Moreno. Presented by W. E. Story.

"The Possible Significance of Changing Atomic Volume." By T. W. Richards.

"The Visible Radiation from Carbon." By Edward L. Nichols.

Contributions from the Gray Herbarium of Harvard University. New Series. — No. XXII. I. "The Northeastern Carices of the Section Hyparrhenae;" II. "Notes on the Variations of Certain Boreal Carices." By M. L. Fernald.

Contributions from the Cryptogamic Laboratory of Harvard University. — XLVII. "Preliminary Diagnoses of New Species of Laboulbeniaceae." — IV. By Roland Thaxter.

Nine hundred and twenty-sixth Meeting.

OCTOBER 9, 1901. — STATED MEETING.

The Academy met at the house of the President, Cambridge. The PRESIDENT in the chair.

The Corresponding Secretary read letters from Theodore Lyman, accepting Resident Fellowship; from George E. Hale, W. W. Keen, E. H. Moore, C. O. Whitman, acknowledging election as Associate Fellows; and from Sir Lauder Brunton,

A. V. Dicey, A. Engler, Henry Jackson, R. Koch, Müller-Breslau, Gaston Paris, Poincare, Fr. Richthofen, acknowledging election as Foreign Honorary Members. He also read letters from the President and Fellows of Yale University, inviting the Academy to be represented at the celebration of the two hundredth anniversary of the founding of Yale College; from the Natural History Society of Nuremberg, inviting attendance at the celebration of its one hundredth anniversary; and from a committee of the Anthropological Section of the American Association for the Advancement of Science, announcing that the thirteenth session of the International Congress of Americanists would be held at New York in 1902, and inviting the Academy to appoint a representative to the General Committee of the Congress.

On the motion of E. S. Morse, it was

Voted, To authorize the President to appoint delegates in response to these invitations.

The Chair announced the following deaths:—

Truman Henry Safford, of Class I., Section 1, and John Fiske, of Class III., Section 3, Resident Fellows.

Joseph LeConte, of Class II., Section 1, Associate Fellow.

Friherre Adolf Erik Nordenskiöld, of Class II., Section 1, Félix Joseph Henri de Lacaze-Duthiers, of Class II., Section 3, and Friedrich Herman Grimm, of Class III., Section 3, Foreign Honorary Members.

On the motion of the Recording Secretary, it was

Voted, To meet, on adjournment, on the second Wednesday in November.

The following gentlemen were elected members of the Academy:—

Henry Smith Pritchett, of Boston, to be a Resident Fellow in Class I., Section 1 (Mathematics and Astronomy).

William Townsend Porter, of Boston, to be a Resident Fellow in Class II., Section 3 (Zoölogy and Physiology).

George Wharton Pepper, of Philadelphia, to be an Associate Fellow in Class III., Section 1 (Philosophy and Jurisprudence), in place of the late William Mitchell.

The President made a few remarks on the condition and prospects of the Academy.

The Rumford Medals were presented to Carl Barus and Elihu Thomson.

The President gave an account of the Albatross Expedition to the Tropical Pacific.

The following paper was read by title:—

“The Algae of Jamaica,” by Frank S. Collins.

Nine hundred and twenty-seventh Meeting.

NOVEMBER 13, 1901. — ADJOURNED STATED MEETING.

The Academy met at the house of James Ford Rhodes.

VICE-PRESIDENT J. B. THAYER in the chair.

The Corresponding Secretary read a letter from Mrs. Cooke, presenting to the Academy a bronze bas-relief of her husband, the late Josiah Parsons Cooke, President of the Academy.

Voted, That the Academy gratefully accept this gift and that the Corresponding Secretary be instructed to inform Mrs. Cooke to that effect.

A letter from the National Society of Natural and Mathematical Sciences of Cherbourg, requesting sympathetic souvenirs on the occasion of the fiftieth anniversary of its establishment, was referred to the Council.

Letters were also read from W. T. Porter, accepting Resident Fellowship; from George Wharton Pepper, acknowledging election as Associate Fellow; from A. Mislowsky, of Ekaterinburg, acknowledging the congratulations of the Academy on the occasion of the fiftieth anniversary of his medical service; from the Nobel Committee of the Royal Academy of Sciences of Sweden, soliciting suggestions for the award of the Nobel Prize in 1902.

Percival Lowell read a biographical notice of the late Augustus Lowell.

William Everett read an essay entitled “The Malignity of Dante.”

A paper entitled “The Parametric Representation of the Neighborhood of a Singular Point of an Analytic Surface,” by C. W. M. Black, was presented by title.

Nine hundred and twenty-eighth Meeting.

DECEMBER 11, 1901.

The Academy met at the Massachusetts Institute of Technology.

The CORRESPONDING SECRETARY in the chair.

In the absence of the Recording Secretary, G. F. Swain was elected Secretary *pro tempore*.

The Chair announced the death of Joseph Henry Thayer, Resident Fellow in Class III., Section 2.

The following papers were read:—

“Some Results from the Last Opposition of Mars.” By Percival Lowell.

“The Atharva Veda and its Significance for the History of Hindu Tradition and Hindu Medicine.” By Charles R. Lanman.

The following papers were presented by title:—

“The Standard of Atomic Weights.” By T. W. Richards.

“Modifications of Hempel’s Gas-apparatus.” By T. W. Richards.

“A New Determination of the Atomic Weight of Uranium.” By T. W. Richards and B. S. Merigold.

“The Decomposition of Mercurous Chloride by Dissolved Chlorides: a Contribution to the Study of Concentrated Solutions.” By T. W. Richards and E. H. Archibald.

“Apatite from Minot, Maine.” By John E. Wolff and Charles Palache.

Nine hundred and twenty-ninth Meeting.

JANUARY 8, 1902. — STATED MEETING.

The CORRESPONDING SECRETARY in the chair.

A letter was read from A. Celli, acknowledging his election as Foreign Honorary Member; also, a circular inviting attendance at the Thirteenth Session of the International Congress of Americanists, in New York, in October, 1902.

The Chair announced the death of Aleksandr Onufrijevič Kovalevsky, Foreign Honorary Member in Class II., Section 3.

The following gentlemen were elected members of the Academy:—

Harry Ellsworth Clifford, of Newton, to be a Resident Fellow in Class I., Section 2 (Physics).

Theodore Hough, of Boston, to be a Resident Fellow in Class II., Section 3 (Zoölogy and Physiology).

Francis Henry Williams, of Boston, to be a Resident Fellow in Class II., Section 4 (Medicine and Surgery).

Morris Hicky Morgan, of Cambridge, to be a Resident Fellow in Class III., Section 2 (Philology and Archaeology).

Edmund Beecher Wilson, of New York, to be an Associate Fellow in Class II., Section 3 (Zoölogy and Physiology), in place of the late George Mercer Dawson.

Julius Hann, of Vienna, to be a Foreign Honorary Member in Class II., Section 1 (Geology, Mineralogy, and Physics of the Globe).

Edwin Ray Lankester, of London, to be a Foreign Honorary Member in Class II., Section 3 (Zoölogy and Physiology), in place of the late Félix Joseph Henri de Lacaze-Duthiers.

Victor Alexander Haden Horsley, of London, to be a Foreign Honorary Member in Class II., Section 4 (Medicine and Surgery).

Friedrich Delitzsch, of Berlin, to be a Foreign Honorary Member in Class III., Section 2 (Philology and Archaeology), in place of the late Friedrich Herman Grimm.

Samuel Rawson Gardiner, of Sevenoaks, to be a Foreign Honorary Member in Class III., Section 3 (Political Economy and History), in place of the late William Stubbs.

The Corresponding Secretary announced that Thomas C. Mendenhall had removed from the Commonwealth and that his name had again been placed in the list of Associate Fellows.

Upon the recommendation of the Council, it was

Voted, To transfer Percival Lowell, Resident Fellow, from Class III., Section 4, to Class I., Section 1.

Upon the recommendation of the committee on amending the Statutes, it was

Voted, To amend the first sentence of Chapter V., Section 2, of the Statutes to read as follows: —

“The Committee of Finance, to consist of the President, Treasurer, and one Fellow chosen by ballot, who shall have full

control and management of the funds and trusts of the Academy, with the power of investing or changing the investment of the same at their discretion."

A. Lawrence Lowell read a paper entitled, "Party Votes in Parliament, Congress, and the State Legislatures."

The following papers were presented by title:—

Contributions from the Gray Herbarium of Harvard University. New Series.—No. XXIII. "A Revision of the Galapagos Flora." By B. L. Robinson.

"The Probable Source of the Heat of Chemical Combinations." By Theodore William Richards.

"A Description of Crystals of Epidote from Alaska." By Charles Palache. Presented by John E. Wolff.

John E. Wolff exhibited a specimen of apatite from Minot, Maine.

Nine hundred and thirtieth Meeting.

FEBRUARY 12, 1902.

In the absence of the regular presiding officers, the chair was taken by CHARLES R. CROSS.

Letters were received from Theodore Hough and Morris H. Morgan accepting Fellowship; from Edmund B. Wilson, acknowledging his election as Associate Fellow; and from the National Society of Natural and Mathematical Sciences of Cherbourg, acknowledging congratulations on the occasion of its fiftieth anniversary.

The Chair announced the following deaths:—

Alpheus Hyatt, Vice-President for Class II.

Clarence King, Associate Fellow in Class II., Section 1.

Karl Weinhold, Foreign Honorary Member in Class III., Section 2.

In accordance with the Statutes, the following Councillors were appointed a committee to nominate a candidate for the office of Vice-President for Class II.:—

HARRY M. GOODWIN, of Class I.

GEORGE H. PARKER, of Class II.

WILLIAM EVERETT, of Class III.

The following communications were presented:—

“Experiments on Forms of Least Resistance to Passage through Air.” By Samuel Cabot. Remarks on this subject were made by Messrs. Davis, Atkinson, Webster, Clayton, and the Recording Secretary.

“What Science has not yet Accomplished in the Art of War.” By Edward Atkinson.

The following paper was presented by title:—

“On the Specific Heat and Heat of Vaporisation of the Paraffine and Methylene Hydrocarbons.” By Charles F. Mabery and Albert H. Goldstein.

Nine hundred and thirty-first Meeting.

MARCH 12, 1902. — STATED MEETING.

VICE-PRESIDENT TROWBRIDGE in the chair.

Letters were read from Friedrich Delitzsch, S. R. Gardiner, Julius Hann, Victor Horsley, E. Ray Lankester, acknowledging their election as Foreign Honorary members.

The Chair announced the following deaths:—

James Bradley Thayer, Vice-President for Class II.

Samuel Rawson Gardiner, Foreign Honorary member in Class III., Section 3.

The vacancy occasioned by the death of Alpheus Hyatt was filled by the election of

HENRY P. WALCOTT, *Vice-President for Class II.*

The following gentlemen were elected members of the Academy:—

Heinrich Oscar Hofman, of Boston, to be a Resident Fellow in Class I., Section 4 (Technology and Engineering).

Thomas Augustus Jaggar, Jr., of Cambridge, to be a Resident Fellow in Class II., Section 1 (Geology, Mineralogy, and Physics of the Globe).

Edward Henry Strobel, of Cambridge, to be a Resident Fellow in Class III., Section 1 (Philosophy and Jurisprudence).

Herbert Putnam, of Washington, to be an Associate Fellow in Class III., Section 4 (Literature and the Fine Arts).

The Chair appointed the following Councillors to serve as Nominating Committee:—

WILLIAM EVERETT, of Class III.

GEORGE H. PARKER, of Class II.

HARRY M. GOODWIN, of Class I.

On the motion of the Recording Secretary, it was

Voted, To rescind Standing Vote 9, "The Annual Meeting and the other stated meetings shall be holden at eight o'clock P. M."

The following papers were read:—

"Biographical Notice of the late Horace E. Scudder." By Thomas W. Higginson.

"Biographical Notice of the late Joseph H. Thayer." By Crawford H. Toy.

"The Formation of River Terraces." By William M. Davis.

"The Spectra of Gases at High Temperatures." By John Trowbridge.

The following papers were presented by title:—

"Experiments on the Effect of Freezing and other Low Temperatures upon the Viability of the Bacillus of Typhoid Fever, with Considerations regarding Ice as a Vehicle of Infectious Disease." By William Thompson Sedgwick and Charles-Edward A. Winslow.

"Statistical Studies on the Seasonal Prevalence of Typhoid Fever in Various Countries and its Relation to Seasonal Temperature." By William Thompson Sedgwick and Charles-Edward A. Winslow.

Nine hundred and thirty-second Meeting.

APRIL 9, 1902.—STATED MEETING.

The Academy met at the house of Robert Amory.

The CORRESPONDING SECRETARY in the chair.

The following papers were read:—

"Account of the Ninth Jubilee Celebration of the University of Glasgow." By William G. Farlow.

"Biographical Notice of the late John Fiske." By A. McF. Davis.

The following paper was presented by title: —

Contributions from the Case School of Applied Science. —
XLI. "On the Hydrocarbons in Pennsylvania Petroleum with Boiling Points above 216°." By Charles F. Mabery.

Nine hundred and thirty-third Meeting.

MAY 14, 1902. — ANNUAL MEETING.

VICE-PRESIDENT TROWBRIDGE in the chair.

The Corresponding Secretary read letters from Henry P. Walcott, accepting his election as Vice-President for Class II.; H. E. Clifford, H. O. Hofman, T. A. Jaggar, Jr., Edward H. Strobel, accepting Resident Fellowship; Herbert Putnam, acknowledging election as Associate Fellow; Madame Cornu, announcing the death of her husband, Alfred Cornu; the University of Oxford, inviting the Academy to send a representative to the commemoration of the 300th anniversary of the opening of the Bodleian Library, on October 8 and 9, 1902; the Royal University of Christiania, announcing the celebration, in September next, of the 100th anniversary of the birth of Nicolaus Henricus Abel and inviting the attendance of delegates.

On the motion of the Recording Secretary, it was

Voted, To appoint Herbert Putnam, Associate Fellow, to represent the Academy at the Bodleian Library commemoration.

The annual report of the Council was read by the Corresponding Secretary.

The Treasurer presented his annual report, of which the following is an abstract: —

GENERAL FUND.

Receipts.

Balance (Deficit), April 30, 1901			\$187.33
Assessments	\$990.00		
Admission fees	150.00		
Sale of publications	138.78	\$1,278.78	
Income from investments		5,735.58	7,014.36
			<u>\$6,827.03</u>

Expenditures.

General expenses			\$2,786.94
Publishing	\$2,095.59		
Library	1,576.68		
Catalogue	95.40	3,767.67	
Balance, April 30, 1902		272.42	
			<u>\$6,827.03</u>

RUMFORD FUND.

Receipts.

Balance, April 30, 1901			\$2,546.08
Income from investments	\$2,514.17		
Sale of publications	5.00	2,519.17	
			<u>\$5,065.25</u>

Expenditures.

Researches	\$1,800.00		
Medals	474.00		
Publishing	417.51		
Library	183.12		
Catalogue	70.00		
Miscellaneous	23.66	\$2,968.29	
Income invested and transferred to capital acc't,		1,715.00	
Balance, April 30, 1902		381.96	
			<u>\$5065.25</u>

WARREN FUND.

Receipts.

Balance, April 30, 1901	\$1,276.29
Income from investments	329.43
	<hr/>
	\$1,605.72

Expenditures.

Investigations	\$845.00
Balance, April 30, 1902	760.72
	<hr/>
	\$1,605.72

BUILDING FUND.

Receipts.

Balance, April 30, 1901	\$360.04
Income from investments	309.51
	<hr/>
	\$689.55

The following reports were also presented :—

REPORT OF THE LIBRARIAN.

The card-catalogue, commenced in 1900, has been continued by the Assistant Librarian, who has type-written during the past year 2770 cards, the total number of cards now being upwards of 4000. Most of the works on general science, mathematics, astronomy, physics, optics, heat and electricity are now catalogued. A catalogue-case was purchased for \$70. Of the \$200 appropriated, the total amount expended on account of the catalogue was \$164.40, of which \$95.40 was charged to the General Fund and \$70 to the Rumford Fund. The same appropriation that was made last year is requested for continuing this work, namely: \$100 from the income of the General Fund and \$100 from the income of the Rumford Fund.

The accessions during the year have been as follows :—

	Vols.	Parts of Vols.	Pama.	Maps.	Total.
By gift and exchange	496	2486	384	2	3368
By purchase — General Fund	18	665			683
By purchase — Rumford Fund	1	256			259
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Total	515	3406	384	2	4310

Last year the total number of accessions was 3919.

At the request of the Rumford Committee, 21 volumes on light and heat, for the purchase and binding of which \$150 was appropriated from the income of the Rumford Fund, have been ordered but not paid for.

The expenses charged to the Library were as follows: — Miscellaneous, which includes expenses in no way relating to the Library, \$439.95; Binding, \$604.70; Subscriptions, \$532.03, making a total of \$1450.38. The usual appropriation of \$1500 from the income of the General Fund is requested in addition to the customary appropriation from the income of the Rumford Fund, namely \$150.

A. LAWRENCE ROTCH, *Librarian*.

Boston, May 14, 1902.

REPORT OF THE RUMFORD COMMITTEE.

At the Annual Meeting of the Academy held May 8, 1901, the sum of \$1000 was placed at the disposal of the Rumford Committee, to be expended at its discretion in aid of researches in light and heat.

The following grants have been voted: —

Nov. 13, 1901. One hundred dollars to Professor Henry Crew of Northwestern University, in aid of his research on the order of appearance of the different lines of the spark spectrum.

Nov. 13, 1901. Three hundred and fifty dollars to Professor R. W. Wood of Johns Hopkins University, in aid of his researches on the anomalous dispersion of sodium vapor.

Nov. 13, 1901. Sixty-five dollars to Professor A. G. Webster of Clark University, in payment of the cost of fluorite plates purchased for use in a research on the distribution of energy in various spectra.

Feb. 12, 1902. Three hundred dollars to Professor Ernest F. Nichols of Dartmouth College, for the purchase of a spectrometer in furtherance of his research on resonance in connection with heat radiations.

April 9, 1902. Three hundred dollars as it is or may become available to Professor Arthur A. Noyes of the Massachusetts Institute of Technology, in aid of his research upon the effect of high temperatures upon the electrical conductivity of aqueous solutions.

At the meeting of February 12, 1902, it was voted to authorize the Librarian to purchase certain books upon light and heat as specified in a list transmitted to him by the Committee.

The following papers, embodying the results of researches aided by appropriations from the Rumford Fund, have been printed in Volume XXXVII. of the Proceedings of the Academy:—

“The Visible Radiation from Carbon,” by Edward L. Nichols.

“The Arc Spectrum of Hydrogen,” by O. H. Basquin.

“The Probable Source of the Heat of Chemical Combination and a New Atomic Hypothesis,” by Theodore William Richards.

Reports of the progress of unfinished researches which have been aided by grants from the Rumford Fund have been received from the following persons: Messrs. Arthur L. Clark, Henry Crew, Edwin B. Frost, George E. Hale, Frank A. Laws, Charles E. Mendenhall, Ernest F. Nichols, Arthur A. Noyes, Edward C. Pickering, Theodore W. Richards, Wallace C. Sabine, R. W. Wood.

The following recommendations have been voted by the Committee, and are now presented to the Academy for its consideration.

On February 12, 1902, it was voted to ask the Academy to appropriate the sum of seven hundred and fifty dollars from the income of the Rumford Fund to be expended for the construction of a mercurial compression pump designed by Professor Theodore W. Richards, and to be used in his research on the Thomson-Joule Effect.

At the meeting of April 9, 1902, it was voted to request the Academy to appropriate the sum of one thousand dollars from the income of the Rumford Fund, for the immediate needs of the Committee in furtherance of research, and also to appropriate the sum of one hundred and fifty dollars from the same source for the purchase and binding of periodicals.

At the meeting of May 14, 1902, it was voted to ask the Academy to reappropriate from the income of the Rumford Fund the unexpended balance of the amount granted at the last annual meeting, for the purchase and binding of books on light and heat for the Library.

The Committee has considered at length the question of an award of the Rumford Premium, and at the meeting of April 9 it was unanimously voted for the first time, and at the meeting of May 14 it was unanimously voted for the second time, to recommend to the Academy that such award be made to Professor George E. Hale, Director of the Yerkes Observatory, for his investigations in Solar and Stellar Physics, and in particular for the invention and perfection of the Spectro-heliograph.

CHAS. R. CROSS, *Chairman.*

REPORT OF THE C. M. WARREN COMMITTEE.

The Committee in charge of the C. M. Warren Fund has the honor to report that Professor Mabery and Professor A. A. Noyes have reported satisfactory progress in the work supported by grants from the Fund. Professor Herty, owing to an unforeseen change of occupation, is unable to continue his work on platinum, and will return the money granted him.

The Committee recommends the following grants from the C. M. Warren Fund for this year:—

C. F. Mabery, of Cleveland, \$300.00 for the continuation of his researches on Petroleum.

A. A. Noyes, of Boston, \$300.00 for the continuation of his work on the qualitative analysis of the rare elements.

H. O. Hofman, of Boston, \$160.00 for a research on the decomposition of sulphate of zinc.

C. L. JACKSON, *Chairman.*

REPORT OF THE COMMITTEE OF PUBLICATION.

The Publishing Committee begs leave to report that there have been issued during the last academic year one number of Vol. XXXVI. and twenty-one numbers of Vol. XXXVII. of the Proceedings, aggregating 648 pages and 15 plates.

Three numbers of the current volume (82 pp. and 2 pl.) were printed at the cost of the Rumford Fund (\$417.51). The expense of printing falling on the General Fund was \$2095.59; the appropriation was \$2400, and the returns from sales \$138.59, leaving an unexpended balance of \$443. The Committee recommends for the ensuing year the usual appropriation of \$2400. An expensive memoir, closing Vol. XII., is in press.

For the Committee,

SAMUEL H. SCUDDER, *Chairman.*

Boston, May 14, 1902.

On the recommendation of the Committee of Finance, it was
Voted, To make the following appropriations from the income of the General Fund for expenditures during the ensuing year:—

For general expenses,	\$2400
For the library,	1500
For cataloguing,	100
For publishing,	2400

On the recommendation of the Rumford Committee, it was

Voted, To make the following appropriations from the income of the Rumford Fund: One thousand dollars (\$1000) for the immediate needs of the Committee in furtherance of research; seven hundred and fifty dollars (\$750) to be expended for the construction of a mercurial compression pump designed by Theodore W. Richards, and to be used in his research on the Thomson-Joule Effect; one hundred and fifty dollars (\$150) for the purchase and binding of periodicals.

Voted, To re-appropriate the unexpended balance of the amount granted at the last annual meeting for the purchase and binding of books on light and heat for the Library.

On the recommendation of the C. M. Warren Committee, it was

Voted, To make the following grants from the income of the C. M. Warren Fund: (1) To C. F. Mabery of Cleveland, three hundred dollars (\$300) for the continuation of his researches on petroleum. (2) To A. A. Noyes of Boston, three hundred dollars (\$300) for the continuation of his work on the qualitative analysis of the rare elements. (3) To H. O. Hofman of Boston, one hundred and sixty dollars (\$160) for a research on the decomposition of sulphate of zinc.

On the motion of the Corresponding Secretary, it was

Voted, That the assessment for the ensuing year be five dollars (\$5).

The annual election resulted in the choice of the following officers and committees:—

ALEXANDER AGASSIZ, *President*.

JOHN TROWBRIDGE, *Vice-President for Class I.*

HENRY P. WALCOTT, *Vice-President for Class II.*

JOHN C. GRAY, *Vice-President for Class III.*

WILLIAM M. DAVIS, *Corresponding Secretary.*

WILLIAM WATSON, *Recording Secretary.*
 FRANCIS BLAKE, *Treasurer.*
 A. LAWRENCE ROTCH, *Librarian.*

Councillors for Three Years.

ARTHUR G. WEBSTER, of Class I.
 EDWARD L. MARK, of Class II.
 ARLO BATES, of Class III.

Member of Committee of Finance.

ELIOT C. CLARKE.

Rumford Committee.

ERASMUS D. LEAVITT,	AMOS E. DOLBEAR,
EDWARD C. PICKERING,	ARTHUR G. WEBSTER,
CHARLES R. CROSS,	THEO. W. RICHARDS,
ELIHU THOMSON.	

C. M. Warren Committee.

CHARLES L. JACKSON,	SAMUEL CABOT,
HENRY B. HILL,	LEONARD P. KINNICUTT,
ARTHUR M. COMEY,	ROBERT H. RICHARDS,
HENRY P. TALBOT.	

The following standing committees were appointed by the Chair: —

Committee of Publication.

SETH C. CHANDLER, of Class I., EDWARD L. MARK, of Class II.,
 CRAWFORD H. TOY, of Class III.

Committee on the Library.

WILLIAM F. OSGOOD, of Class I., SAMUEL HENSHAW, of Class II.,
 HENRY W. HAYNES, of Class III.

Auditing Committee.

HENRY G. DENNY, WILLIAM L. RICHARDSON.

The following gentlemen were elected members of the Academy:—

Arthur James Balfour, of London, to be a Foreign Honorary Member in Class III., Section 1 (Philosophy and Jurisprudence), in place of the late Charles Russell, Baron Russell of Killowen.

William Edward Hartpole Lecky, of London, to be a Foreign Honorary Member in Class III., Section 3 (Political Economy and History), in place of the late Samuel Rawson Gardiner.

On the recommendation of the Rumford Committee, it was *Voted*, To award the Rumford Premium to George Ellery Hale, of the Yerkes Observatory.

James Barr Ames read a biographical notice of the late James Bradley Thayer.

A biographical notice of the late Alpheus Hyatt, by Alpheus S. Packard, was read by the Corresponding Secretary.

The following papers were presented by title:—

"The Influence of Atmospheres of Nitrogen and Hydrogen on the Arc Spectra of Iron, Zinc, Magnesium and Tin, compared with the Influence of an Atmosphere of Ammonia." By Royal A. Porter. Presented by Charles R. Cross.

"On the Multiple Points of Twisted Curves." By John N. Van der Vries. Presented by William E. Story.

"Regular Singular Points of a System of Homogeneous Linear Differential Equations of the First Order." By Otto Dunkel. Presented by Maxime Bôcher.

Contributions from the Cryptogamic Laboratory of Harvard University.—L. "Preliminary Diagnoses of New Species of Laboulbeniaceae."—V. By Roland Thaxter.

Contributions from the Cryptogamic Laboratory of Harvard University.—LI. "On *Cauloglossum transversarium* (Bosc) Fries." By J. R. Johnston. Presented by Roland Thaxter.

"On the Ionization of Soils." By Amon Benton Plowman. Presented by George Lincoln Goodale.

Contributions from the Gray Herbarium of Harvard University. New Series.—XXV. I. "Flora of Cocos Island of the Pacific." II. "Diagnoses and Synonymy of some Mexican Spermatophytes." By B. L. Robinson.

"On the Dibromdinitrobenzols derived from Paradibrombenzol." Second paper. By C. Loring Jackson and D. F. Calhane.

"On the Colored Substances derived from Nitro-compounds." Fourth paper. By C. Loring Jackson and R. B. Earle.

"On Certain Derivatives of Picric Acid." By C. Loring Jackson and R. B. Earle.

"On Symmetrical Dinitrobenzolsulphonic Acid." By C. Loring Jackson and R. B. Earle.

"On Certain Derivatives of 1, 2, 3-tribrombenzol." By C. Loring Jackson and A. H. Fiske.

A TABLE OF ATOMIC WEIGHTS

OF SEVENTY-SEVEN ELEMENTS.

Compiled in April, 1902, from the most Recent Data.

BY THEODORE WILLIAM RICHARDS.

Name.	Symbol.	Atomic Weight.	Name.	Symbol.	Atomic Weight.
Aluminium . . .	Al	27.1	Molybdenum . .	Mo	96.0
Antimony . . .	Sb	120.0	Neodymium . .	Nd	143.6
Argon	A	39.92	Neon	Ne	19.94
Arsenic	As	75.0	Nickel	Ni	58.71
Barium	Ba	137.43	Niobium	Nb = Cb	94.
Beryllium . . .	Be = Gl	9.1	Nitrogen	N	14.04
Bismuth	Bi	208.	Osmium	Os	190.8
Boron	B	11.0	Oxygen (standard)	O	16.000
Bromine	Br	79.955	Palladium . . .	Pd	106.5
Cadmium	Cd	112.3	Phosphorus . . .	P	31.0
Cæsium	Cs	132.88	Platinum	Pt	195.2
Calcium	Ca	40.13	Potassium	K	39.14
Carbon	C	12.001	Praseodymium . .	Pr	140.5
Cerium	Ce	140.	Rhodium	Rh	103.0
Chlorine	Cl	35.455	Rubidium	Rb	85.44
Chromium	Cr	52.14	Ruthenium	Ru	101.7
Cobalt	Co	59.00	Samarium ? . . .	Sm	150.
Columbium . . .	Cb = Nb	94.	Scandium	Sc	44.
Copper	Cu	63.60	Selenium	Se	79.2
"Didymium" . .	Nd + Pr	142.±	Silicon	Si	28.4
Erbium	Er	166.	Silver	Ag	107.93
Fluorine	F	19.05	Sodium	Na	23.05
Gadolinium . . .	Gd	156. ?	Strontium	Sr	87.68
Gallium	Ga	70.0	Sulphur	S	32.065
Germanium	Ge	72.5	Tantalum	Ta	183.
Glucium	Gl = Be	9.1	Tellurium	Te	127.5 ?
Gold	Au	197.3	Terbium ?	Tb	160.
Helium	He	3.96	Thallium	Tl	204.15
Hydrogen	H	1.0076	Thorium ?	Th	233. ?
Indium	In	114.	Thulium ?	Tu	171. ?
Iodine	I	126.85	Tin	Sn	119.0
Iridium	Ir	193.0	Titanium	Ti	48.17
Iron	Fe	55.88	Tungsten	W	184.
Krypton	Kr	81.7	Uranium	U	238.5
Lanthanum	La	138.5	Vanadium	V	51.4
Lead	Pb	206.92	Xenon	X	128.
Lithium	Li	7.03	Ytterbium	Yb	173.
Magnesium	Mg	24.36	Yttrium	Yt	89.0
Manganese	Mn	55.02	Zinc	Zn	65.40
Mercury	Hg	200.0	Zirconium	Zr	90.6

NOTE.

THE accompanying table of atomic weights is but little changed since last year. Cæsium is made 132.88 instead of 132.9; calcium, 40.13 instead of 40.1; iron, 55.88 instead of 55.9; hydrogen, 1.0076 instead of 1.0075; and nickel, 58.71 instead of 56.70. The value for cæsium is due to some work, as yet unpublished, of Richards and Archibald, and that for calcium is increased in accuracy because the recent investigation of Hinrichsen* supports the less recent Harvard value.† The other very small changes are due simply to slight differences in the interpretation of data already well known. The decimal might have been omitted from palladium, because this element may still be a whole unit in doubt; but it has been retained as a compromise.

The differences between the present table, that of the German Committee,‡ and that of F. W. Clarke,§ are diminishing year by year. Nevertheless to as many as twenty-eight elements out of the seventy-seven are given values in these three tables differing among themselves by over one tenth of a per cent; namely, the atomic weights of antimony, bismuth, cerium, columbium, fluorine, gadolinium, germanium, helium, hydrogen, lanthanum, magnesium, mercury, neon, osmium, palladium, platinum, potassium, samarium, scandium, selenium, tantalum, tellurium, thorium, thulium, tin, titanium, uranium, and zirconium. To this list of uncertain elements should be added erbium, gallium, glucinum, indium, terbium, tungsten, ytterbium, upon which the three tables agree only because of lack of data upon which to base a disagreement. Thus nearly half of the elements are still in doubt by at least one part in a thousand. This circumstance is not so much a reproof to the many earnest workers upon the subject, as an evidence of the great difficulty of some of the problems involved.

Three of the elements given in the list above should not properly be included among the uncertain values, namely, hydrogen, magnesium, and potassium. The first finds its way into the list because of the disregard of significant figures by the German Committee, and the second chiefly because Clarke has included in his calculation work upon magnesian oxide undoubtedly erroneous on account of the presence of included gases. || The case of potassium is somewhat peculiar; for in spite of the great wealth of data concerning this element, Clarke assigns to it the value 39.11, while the German Committee chooses 39.15. The low value is chiefly due to very unsatisfactory data concerning potassic iodide. To me it seems that the most recent work of Stas is far more satisfactory than his earlier work or than the work of any one else, hence the value 39.14 has been assigned to potassium in the present table since its first publication. Careful analyses by E. H. Archibald and myself confirm this conclusion.

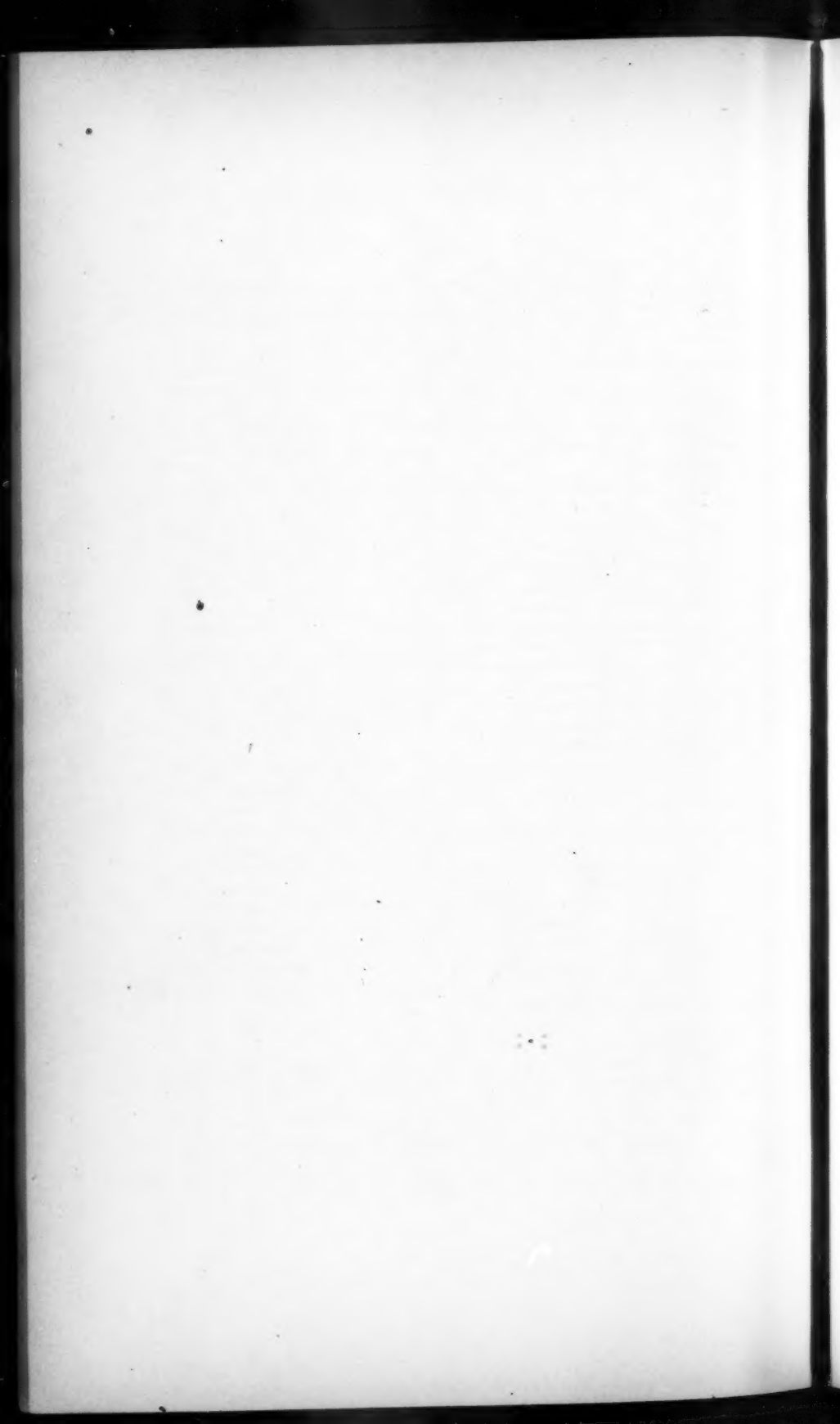
* Hinrichsen, *Zeitschr. phys. Chem.*, **39**, 311 (1901).

† Richards, *Journ. Am. Chem. Soc.*, **22**, 72 (1900), also **24**, 374 (1902).

‡ Landolt, Ostwald, and Seubert, Extra insertion in *Berichte d. d. ch. Ges.* 1902. Heft 1.

§ F. W. Clarke, *Journ. Am. Chem. Soc.*, **24**, 201 (1902).

|| Richards and Rogers, *These Proceedings*, **28**, 209 (1893).

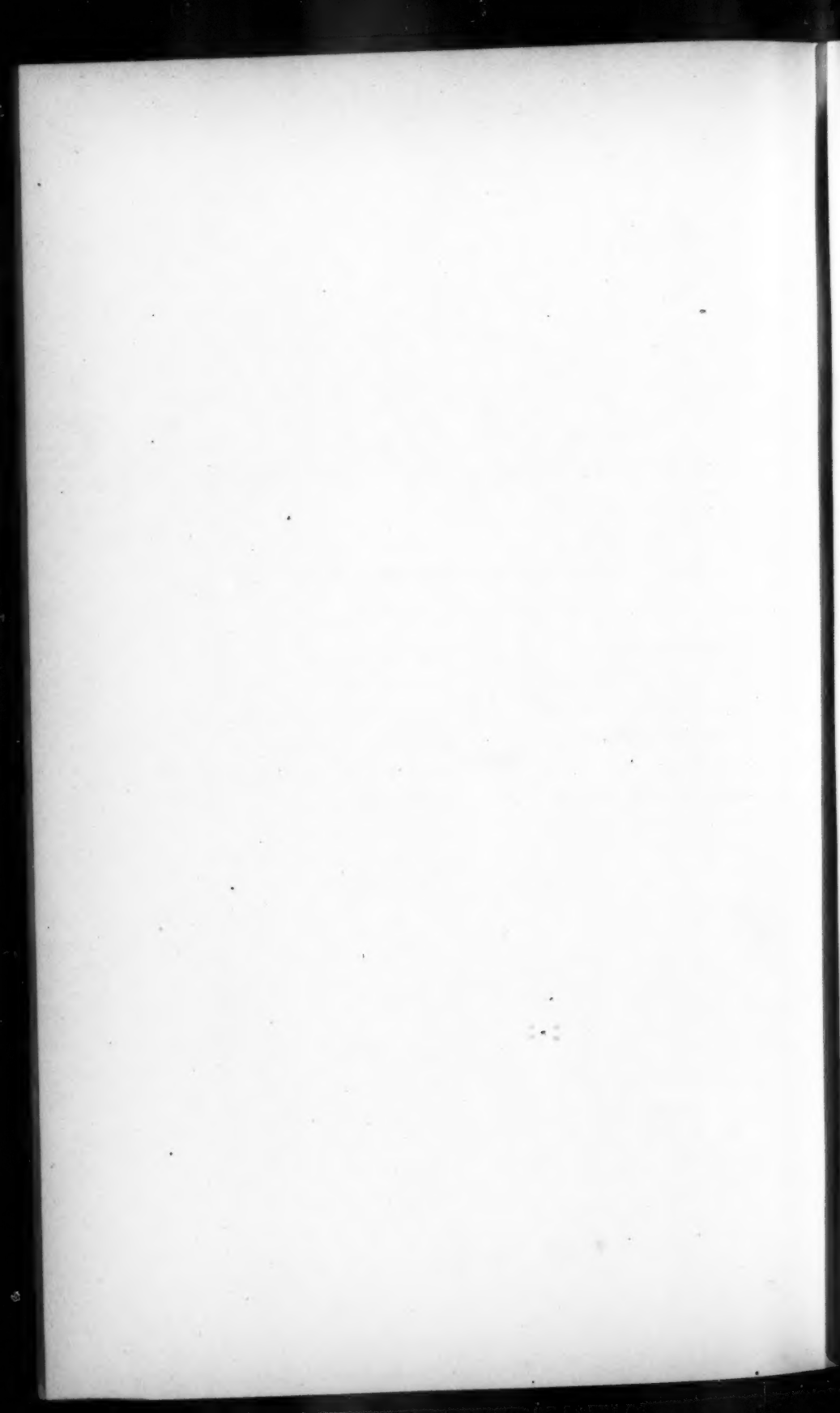


AMERICAN ACADEMY OF ARTS AND SCIENCES.

REPORT OF THE COUNCIL. — PRESENTED MAY 14, 1902.

BIOGRAPHICAL NOTICES.

AUGUSTUS LOWELL	PERCIVAL LOWELL.
TRUMAN HENRY SAFFORD	ARTHUR SEARLE.
HORACE ELISHA SCUDDER	THOMAS WENTWORTH HIGGINSON.
JOSEPH HENRY THAYER	C. H. TOY.
JOHN FISKE	ANDREW MCFARLAND DAVIS.
JAMES BRADLEY THAYER	JAMES BARR AMES.



REPORT OF THE COUNCIL.

The Academy has lost sixteen members by death since the annual meeting of May 8, 1901: Six Resident Fellows, — John Fiske, Alpheus Hyatt, Truman Henry Safford, Horace Elisha Scudder, James Bradley Thayer, Joseph Henry Thayer; two Associate Fellows, — Clarence King, Joseph LeConte; eight Foreign Honorary Members, — Marie Alfred Cornu, Samuel Rawson Gardiner, Friedrich Herman Grimm, William Edward Hearn, Aleksandr Onufrijevič Kovalevsky, Félix Joseph Henri de Lacaze-Duthiers, Friherre Adolf Erik Nordenskiöld, Karl Weinhold.

AUGUSTUS LOWELL.

AUGUSTUS LOWELL was born in Boston, Jan. 15, 1830. His father was John Amory Lowell and his mother Elizabeth (Putnam) Lowell, daughter of Hon. Samuel Putnam of Salem. Both the Lowell and the Putnam families were early settlers in the new world, the former landing in Newburyport in 1639, the latter in Salem in 1630. Mr. Lowell thus came of Puritan stock on both sides. Otherwise the parts of his inheritance differed, for the Lowells were Norman by descent — the name, originally Lowle, dating from the conquest — while the Putnams, originally Puttenham, were apparently Saxon. He inherited the qualities of his name. Mentally he was the son of his father; as a matter of fancy as much as of fact, his mother's share in him being chiefly physical. For while in feature he looked like her, in mind he not only resembled his father but looked up to him with a very unusual amount of reverence and esteem. The feeling doubtless was born of the fact and is noteworthy because of the common belief that capable men have had capable mothers. Yet not only in his case but in the case of his father, grandfather, and great-grandfather before him, the capacity followed the name. Indeed the family has proved a singular instance of prepotence in the male line, while the temperament has been as strikingly a maternal gift.

In Boston and in its immediate neighborhood his boyhood was spent. Of the winter delights of town as seen through youthful eyes we are given a glimpse in a letter written at the time to his friend, Mr. Augustus Peabody. Chief among them it would seem was coasting on the Common, and in the epistle we are informed of the existence of two coasts there: "one the big boys' coast and the other the small boys' coast;" "but," the writer adds to fire the ambition of his friend and so induce him to come up for a visit, "the big boys do coast on the small boys' coast and the small boys do coast on the big boys' coast." The rounded accuracy of this statement, devoid of even the least suspicion of the elliptical, testifies conclusively to the writer's time of life.

His father had inherited the family country place in Roxbury, which then was country indeed, innocent of bricks and mortar, of city streets and of course of railroads. Horses and carriages made sole means of outside communication. Partly from necessity, therefore, partly for pleasure, Mr. John Amory Lowell every day drove into town to his business and with him he took his son to attend the Boston Latin School. This school, so named from teaching "small latin and less greek," was then the popular school for boys of the place. To it in consequence went many well-known men, among them his lifelong friends, Mr. George A. Gardner and Mr. Thornton K. Lothrop. The "small latin" was hardly such in quantity, if one may judge by report of the approved Latin grammar of the day. Indeed education would seem to have consisted of the learning by heart — pathetically so called in such connection — of a mass of rules and their elephantine exceptions, sufficient to stagger even a Roman into speaking something else. At all events, of the son's labors at that institution of learning the sole document extant is of the *lucus a non* kind: a petition to his Honor the Mayor and Chairman of the School Committee to allow the boys the first day of May as a holiday in which they might "enjoy the beauties of nature and a recreation and relaxation from school labors." Mr. Lowell appears heading the interesting document, which "was couched as convincingly as possible by a classmate.

By nature the place in Roxbury was beautiful, though one would never divine it to-day. Shorn of its fine old trees, even pared of its hills, the land is possessed now by a brewery and tenement houses. But in those days it was otherwise, as fading photographs show, and its garden was both a delight and a name. For Mr. John Amory Lowell had two pastimes, algebra and botany. His spare moments were devoted to one or the other of these pet pursuits. When he was not setting himself problems he was puttering over plants. And he did both to some effect.

His algebraic propensities won him local reputation as a mathematician, and a manuscript volume upon the same, still in the family's possession, is both curious and interesting reading. As a botanist he was known not only at home but abroad, and was on terms of correspondence, not to say criticism, with botanists of his day. His botanical care was not confined to the living; in his studies he collected a fine herbarium which received fully as much of his attention, and attracted attention from others. The son inherited both paternal proclivities, but both rather as deep-seated mental characteristics than as current mental traits. Mathematics he neither cared for, nor was proficient in, but he derived from his father that logical exactness of mind which is their basis. The botany bore greater fruit. His tastes for plants, including both trees and flowers, proved a very deep-seated passion. Doubtless fostered in part by his father's familiarity with shrubs — though as a boy he showed no marked symptoms of botanic zeal — the love of growing things later became his most pronounced avocation.

In 1846 Mr. Lowell entered Harvard College where he spent the four years enjoined for a degree and was duly graduated in 1850. It was not then more than it is now the fashion to study, and he took his parchment void of invidious distinction. Indeed his recollections do not seem to have been specially academic, as one of the most vivid of them had to do with a certain midnight ride for illicit purposes to the Watertown arsenal. His rank in his class, if I am right, was sixteenth, just below what was at the time the Φ BK line. He was not therefore a member of that deservedly distinguished society of learning, but it is significant of his subsequent standing in the community that on the fiftieth anniversary of his graduation he was elected into it as an honorary member, an honor he never lived to receive or even know of, as unknown to the election committee he was on his deathbed at the time.

In college he was neither dissipated nor lazy. His course was much like that of all his fellows, and is distinguished from the commonplace only by a comical dream with which his ancestors saw fit to favor him later on the subject. I say his ancestors advisedly as will shortly appear, and I repeat the dream partly because of its touch of humor, of which he was always fond, and partly because of its psychologic import. The gusto with which he related it at the time proves the censure implied to have been undeserved, but the atavism betrayed by it makes it worth recording.

It was the family tradition that at college its scions should be students, a traditional devoir handed down from father to son, though I am not aware that the fathers always followed it themselves as religiously as

they inculcated it upon the sons. In consequence of his supposed neglect of this precept, it was perhaps not unnatural that his ancestors should disapprove and should show their disapproval. This they did in the only way in their power — by means of a dream. For dreams are really reversions to type and are in consequence very interesting things. When we dream it is the atavic paths of which we are conscious. We think again the thoughts of our progenitors.

The occasion of this visitation was the going up of his second son for the entrance examinations, and the paternal mind was naturally full of the subject. With the unimpeachable authority of dreams he was suddenly made aware one night that he had not done all he might in college. Profoundly stirred by the thought, the singleness of which made it pass for truth, he decided after due and weighty consideration — lasting at least a tenth of a second — to enter the university once more and go over the course again. The fact that he was middle-aged, married, and had a large family only made the resolve seem, after the manner of dreams, the more meritorious. On the strength of his already holding a degree, the college faculty consented to admit him without examination. He was thus enabled triumphantly to get in. His action caused some comment, chiefly commendatory, such as follows an unusually pious deed. He thus became, against his will, something of a cynosure. So the first year glided by till with a speed peculiarly their own the annual examinations were upon him and with them the eyes of the community. Then, and somehow not till then, did he realize, to his consternation, that he had done nothing and was quite unprepared to pass. The situation was beyond words. At this awful moment he woke, — to the pleasing consciousness that his son, not he, would have to pass them on the morrow.

Just before his graduation in 1850 his father, who was not very well, decided to go abroad with his family, including his son Augustus, in the event of needing his help. Mr. Lowell stayed with his father till the spring of 1851. In Paris he was joined by his friend and classmate, Mr. Lincoln Baylies, and there at the same time was John Felton, brother of the then president of the college, with whom the two young men foregathered. John Felton was something of a character and a good deal of a man, with fiery red hair on the outside of his head and much genial wit and wisdom within it. Under his guidance, philosophy, and friendship the two young men passed an interesting and not unprofitable winter, frequenting the theatres to pick up French. Labiche was then in his prime. In the spring the two classmates went off to travel in Germany and Switzerland, and returned by themselves in the autumn to the United States.

On getting home he began his career in State Street, going into the counting-room of Bullard & Lee, East Indian merchants, to learn the business. His quickness of body as well as of mind here procured him a questionable distinction. From his father he had inherited considerable athletic ability, and it was soon discovered in the office that he was fleet of foot. In consequence he was promoted to the post of messenger, with the duty of carrying the foreign business letters to the mail. Now Mr. Lee was addicted to lengthy epistles, to extreme peculiarity in completing them, and to never finishing on time. As the mail was inconsiderate of their importance, he eagerly embraced Lowell's pedestrian possibilities. In consequence it soon became the regular thing for young Lowell to be seen standing, watch in hand, waiting while Mr. Lee completed his last page, folded the foolscap down methodically with his large thumb, and elaborately sealed it. Meanwhile the minutes slipped by with the young man calculating if he still had time to catch the post. It was midsummer and hot. Nevertheless the human Mercury was kept standing within, regardless of how its metallic namesake stood without. Finally when only running at his topmost speed would suffice to get the letter in he would hint that there were but six minutes more before the mail closed. "How many did you make it in last time, Augustus?" Mr. Lee would ask. "Five and three-quarters, sir, but I had to get it in the back way." "I think you can do it this time then." And he did.

This little episode occurred as regularly as mail day. After it had been cheerfully going on for some months, Mr. Bullard, who had been abroad, came home and one afternoon happened in on it. He said nothing at the time; but when Lowell, hot and breathless, had returned once more successful he called him into his private office. "Does what I saw this afternoon occur often, Lowell?" he said to him. "Every mail day, sir," the young man answered. "It shall not occur again," he said. And it never did. With tact equal to his considerateness, Mr. Bullard, on the ground — if I am right — of preferring to do it himself, from that day took the foreign correspondence into his own hands. Perhaps — after Balzac's phrase — this episode may be put between leads and given the air of a thought: the young man who goes quickly will go far.

After two years spent with Bullard & Lee Mr. Lowell's father thought it advisable the young man should learn another line of business, — one in which the family was interested. Francis C. Lowell, the elder, who was the founder of the cotton manufactures of New England and after whom Lowell — their chief seat — was named, was the uncle of Mr.

Lowell's father. In consequence the father had come himself into connection with them, and it seemed well that the son should do likewise. He was therefore sent to Lowell to become practically acquainted with the running of the mills. The house in which he boarded was kept by a woman who was destined through her own exertions to no little notoriety later on. She had a sister who had a beautiful voice. This voice was one of the few alleviations of the place to the boarders, and the same voice, more ably than considerably exploited by the boarding-house keeper, proved the family's making. For the boarding-house keeper was so successful in her management that she soon became the proprietress of the Revere House in Boston, and next emerged by the help of the voice at her entertainments into one of the chief lights of Newport and New York society. Such in a nutshell was the career of Mrs. Paran Stevens.

After passing a year at the mills, Mr. Lowell in 1853 became engaged to and in 1854 married Katharine Bigelow Lawrence, the youngest daughter of the Hon. Abbott Lawrence, then recently returned from his post at the Court of St. James. Mr. Lawrence was as closely identified with the then nascent cotton manufactures of New England as was Mr. John Amory Lowell. Mr. Augustus Lowell thus found himself doubly involved in them, first by birth and then by marriage. For the two centres of the industry were the towns of Lowell and Lawrence, the one named as I have said after his father's uncle, the other after his father-in-law. On his engagement Mr. Lawrence put him in with J. M. Beebe, Morgan & Co. Thus for the years preceding and following his marriage he was busy learning the details of what was to make Massachusetts' mercantile greatness, her manufacturing interests. With one exception, from this period to the end of his life, he was always associated in one way or another with the Lowell and Lawrence mills. He was successively treasurer, that is, the executive head, of more than one of them, and president of many others.

The exception occurred some time after Mr. Lawrence's death, which happened in 1855, when Mr. Lowell entered into business ventures of his own, forming a partnership with Mr. Franklin H. Story for the purpose of engaging in the East Indian trade. For some years this trade was profitable, but the firm was brought to a close by the panic of 1857, for though the firm did not suffer the East Indian trade did. The friendship remained, and among the pleasantest incidents of the writer's boyhood was the acquaintance of this genial gentleman. By a coincidence he died only about a week before his former partner.

In 1864 the health of his wife necessitated his taking her and his family abroad. They sailed for England in May, and for the next two years and a half lived in Europe; the summers spent in travelling, the winters in Paris. To one so temperamentally prone to a busy life at home, this existence was no sinecure. With a wife at the point of death as it was thought and four young children, Mr. Lowell had his hands full. For a long time Mrs. Lowell did not gain at all. Indeed it was only during the second summer, under the treatment of a country doctor fortuitously encountered in the Austrian Tyrol, that she began to mend. It is instructive, if tardy, to perceive now, in view of the widespread professional ignorance on the subject, that what Mrs. Lowell was suffering from was nervous exhaustion, — a disease, this, which it may be noted incidentally, Faraday, Darwin, Huxley, and Parkman all suffered from without knowing it.

Three little episodes may serve to mark these years of a search after health. The first summer the wanderers happened to be at Bonchurch in the Isle of Wight when the action between the "Kearsarge" and the "Alabama" took place just across the channel off the coast of France. In the second they were among the first to go to that nook in the Austrian Salzkammergut, the village of Ischl, since become well known and popular. In the third and last they were lodged at Schwalbach near Wiesbaden, when that little watering place suddenly became one of the seats of war, and thereupon was occupied alternately by the two opposing forces, the invading Prussians and the native Hessians. Usually evacuation considerably took place before occupation set in; but once by accident the two interfered and a battle occurred between the rear guard of the one army and the advance scouts of the other under the very windows of the hotel. The Hessians, who had been quartered in the town, had heard of the proposed Prussian advance and had at once started to evacuate the place. But they were a little too Teutonically slow. The invaders, although Prussians and *landwehr* at that, were, quite to their own surprise, too quick for them; a belated squad of Hessians had got only halfway up the hill on its way out when the Prussian cavalry was heard cantering into the town. There was no time to go on unseen when fortunately a friendly wood pile by the side of the road offered its shelter. Instantly the squad deployed behind it and waited. Five minutes later three cavalymen cantered past the hotel, their pistols pointed at the windows as they went by, and started unsuspectingly up the hill. The spectators in the secret stood waiting the surprise. Just as the dragoons got abreast of the wood pile the squad deployed out and fired.

One dragoon fell on the spot, a second turned like a flash and leaped his horse over an embankment twenty feet to a road below, while the third wheeled in his tracks and came galloping wildly down the street again. All which served to relieve the watering place dulness.

By the autumn of 1866 Mrs. Lowell was so far recovered that Mr. Lowell was able to return with her to the United States. It was many years before he left it again.

He now took an office next his father's, and became gradually connected, on the one hand, with the manufacturing interests which his father controlled, and on the other with the many trusts his father managed. During Mr. John Amory Lowell's subsequent absences in Europe the care of these things devolved upon his son, and with the former's increasing years the care became more and more permanent. In 1875 he was chosen treasurer of the Boott Cotton Mills. This office he held for eleven years. About the same time he was elected to succeed his father on the board of the Massachusetts Hospital Life Insurance Company,—familiarily known as the Life Office, State Street's oldest, staidest, and most famous institution, whose real business has but a bowing acquaintance with its name,—and later was put upon its executive committee. Of the corporation of the Provident Institution for Savings,—another financial landmark, not so deceptively named to the uninitiated,—he was likewise made a member, and eventually became its president, succeeding the Mr. Lee of epistolary fame. At this date too he began his long career upon the board of the Boston Gas Light Company, then so ably managed by Mr. Greenough, a career which ended more than twenty years later in the negotiations he conducted as its president when it became necessary to sell the property, which he did for two and a quarter times all it had ever cost. In addition to holding the offices above mentioned he was treasurer of the Merrimack Manufacturing Company, June 20–October 29, 1877; president of the Massachusetts Cotton Mills; of the Massachusetts Mills in Georgia; of the Pacific Mills; of the Merrimack Manufacturing Company, 1887–8, 1892 to death; of the Boott Cotton Mills; of the Lowell Bleachery; of the Lowell Machine Shop; of the Glendon Iron Company; and a director of the Everett Mills; of the Middlesex Company; of the Lawrence Mills; of the Lowell Manufacturing Company; of the Suffolk National Bank; of the Cranberry Iron Company; of the Plymouth Cordage Company; besides being a trustee of the Union Trust Company of New York. This long list means even more than it usually would; for Mr. Lowell was a director who did direct. In every concern into which he entered he very soon took

a leading part. Never seeking a place, his ability was such that he found himself forced into position after position of responsibility. Indomitable, he was always selected to do what others agreed ought to be done but were averse to doing. For Mr. Lowell knew no such thing as shirking in the discharge of duty. He disliked the disagreeable as much as any one, but he was not weak. Of the financial position he held in the down-town community it is enough commentary that seven bonds of treasurers of great corporations were found in his tins at his death, deposited with him as president.

Such were the business concerns with which he was connected. But side by side with them he gave much time and thought to matters of more public interest. For many years he was a trustee of the Boston Eye and Ear Infirmary. Not simply one in name, for to him and to Mr. Brown its management was for a long time chiefly due.

Ex-officio he was a trustee of the Boston Art Museum for twenty years, and a trustee of the Lowell Textile School for the four years preceding his death. Of purely public functions he once performed one, that of member of the Boston School Committee in 1857-58, and from the echoes of this which have reached the writer it would seem that politics played as objectionable a part in what should have been above them then as now.

Before going abroad he had had a summer place at Beverly, but attributing the loss of a child there to unhealthiness of the shore he sold it. On coming home he cast about for a country-place where he could live the year round, as being alike beneficial for his wife and his children. He found it in Brookline. His children were still young, and he took to repeating the experience of his own boyhood, driving them and himself into town every day to school and to business respectively. Out of it, beyond business hours, his life was now quite bucolic. The place he had bought possessed already a fine garden and two greenhouses. In them he centred his affections, greenhouse and garden dividing the year between them. Two hot-houses of grapes helped to shield the latter, which lay in a hollow open to the south. Natural embankments enclosed it on the east and west, and a raised roadway, shut off from view, made artificial protection on the north. Clipped evergreens stood for sentinels along a terraced path, ending in an arbor which fringed one side of it, and a corresponding row faced them upon the slope opposite. In this sheltered spot he spent much of his time. Pruning his shrubs, tying up his plants, and attending generally to the welfare of his flowers, he was almost as much of an inhabitant of the place as they. It was a world in

which he found infinite satisfaction. His roses were his chief delight. And fine they were — no finer than the feeling with which he showed them off. But nothing vegetal was alien to him. He would point out with almost as much zest, punctuated by a wink, a foreign thorn-tree, which flanked the avenue, a platted mass of thorns a foot long, the despair of squirrels and cats.

His botany was of the old-fashioned kind. He did not pursue it as a science, but cultivated it as an art. His plants were rather pets than subjects for vivisection. Philosophically he was not concerned with their genealogy or relationship and disbelieved Darwinism to the day of his death. But in his intercourse with them he knew the life and the merits or demerits of each, and took pleasure in their thriving with something like affectionate interest. He behaved like a distant relative, the while stoutly denying that he was one. Indeed the relation did not seem so very distant, for he was never tired of attending to them, and took a paternal pride in their introduction to others. He would conduct you to view some bush at the moment in flower, and point out in what lay its peculiar praiseworthiness with the care of long acquaintance. Pretty much every tree upon his place — and it included some rare ones — was personally known to him. And if you strolled round with him he would talk fine print about each with you. He was constantly importing new plants and then watching them succeed. Though he made no parade of knowledge or of success, he not infrequently had plants which knew no rival in the neighborhood. A contrast this side of his life made with that of his morning down-town, where he played so prominent a part in the active affairs of men.

The long list of business offices held by him might lead one to infer that his time in the city must have been fully occupied by them alone. But he was much too busy a man for such to be the case. With all his industrial and financial concerns he found time for an equal employment in educational affairs. His ability was of the executive kind, which was as vital to the one as to the other. It thus came about that side by side with his business, and almost hand in hand with it, so practical was he in his workings, went another employment — usually only on speaking terms with the first, and then those of a beggar — the conduct of educational concerns. Busy as Mr. Lowell was with purely business affairs, he was equally engaged in matters of mind. Partly the accident of birth, partly the possession of ability, placed him in positions of authority in two important educational institutions: the Lowell Institute in the first place, and the Massachusetts Institute of Technology in the second.

Of the first of these he became the trustee in 1881, on the death of his father. Even before this, however, much of the work had fallen to him. The Lowell Institute is too well known to need description, but one phase of it will bear mention in connection with the man who for so long was its trustee. Most institutions of learning live by begging. If they happen to be possessed of presidents who are past masters in the art, they thrive; if not so blessed, they languish. That a president should be an able intellectual director is unfortunately not so pressing a demand as that he should be a persistent, importunate, and successful beggar. In view of this fact deficits in college finances have lost their terror and surpluses are unknown, a sympathetic public being with confidence relied on to stand in the gap. Now the peculiarity of the Lowell Institute has been not only that it is not dependent upon alms-giving but that it has thriven and grown without it. Although on the one hand it has paid larger salaries than any college or kindred institution to the teacher, it has asked no fee whatever of the taught. Yet despite this liberality on both sides, its funds have more than quadrupled in amount. Part of this increase has been due to the wise terms of the endowment, part to the like wisdom of the two successive trustees. Kindred wisdom it has been in both senses, for by a provision of the testator the trustee must be of the testator's family if a fit person exist of the name. How fit Mr. Lowell was for the post this able result of his administration of the finances attests.

But besides being its financial head, Mr. Lowell was its intellectual body and its executive arm as well. For the Institute is a one man power, an absolute dictatorship. Mr. Lowell was president, corporation, and treasurer all together. And the success he made of it shows again the wisdom of such a rule, provided only the ruler be fit. Of his capacity as financier the property speaks; of his ability in general administration the list of lecturers before the institution sufficiently betokens. At the time the Institute was founded lectures were a popular form of instruction, and the object of the testator was to secure for the people of Boston lectures by the most eminent men at home and abroad, and to give these to the public free of charge. His wish has been well carried out. On the roster of the books are to be found a majority of the names which are known the world over, and almost every one of those to whose possessors distance or age or language did not prove an impassable bar. America, Europe, even Asia have contributed to the list. Some of these men came more than once; and many of them became well known personally to Americans. But the fact connected with them which speaks

most for the institution and its trustee is that well-nigh without exception each came originally at his instigation. Almost all the famous foreigners in science, literature, or art who have been in this country have owed their personal introduction to it to the trustee of the Lowell Institute. Since from over seas these lecturers came, simply as a bond between countries the Institute has played no unimportant part.

Mr. Lowell's tie to science was thus rather indirect than direct, but it was none the less intimate if in a different way. By virtue of his office he was brought personally in contact with the scientists of his day, and in a most pleasant and withal domestic manner. For besides meeting them at the lectures, of which he always attended the opening one and oftener than not the whole course, he was in the habit of entertaining the lecturers during their stay in Boston at his house at dinner, sometimes more than once. Many is the memorable evening he passed in consequence with men who have made the world what it is. Such personal knowledge of a man is as invaluable as it is invigorating. Even in an estimate of the mind a side light of no mean value is shed on it by intercourse with the personality. The man proves a footnote to his own writings. This advantage of glosses on the text Mr. Lowell possessed; and in various aspects in as much as he was thrown with these men in diverse relations. Intercourse of the sort he enjoyed more or less for nearly half a century. For, as I have said, before he became trustee he had been acting for his father, and even before that had met the lecturers at his father's house. During the second half of the nineteenth century he had thus been familiar, not only with the century's best thought, but with most of its best thinkers. And he passed away just as the century itself was drawing to a close.

Coincident with holding this responsible post in educational matters of a general character Mr. Lowell filled a second position of a more direct kind and not less important. For quite as long a term as he managed the Lowell Institute was he associated with the government of the Massachusetts Institute of Technology. Entering the corporation of that institution in the early seventies, he very soon took a leading part in its policy. From that time the conduct of its affairs had been intimately connected with him, much more so than the public is cognizant of. For Mr. Lowell never put himself forward, having an innate aversion to unnecessary publicity. Even on the few occasions when it was indispensable for him to appear, he only did so, as those in his confidence are aware, after great reluctance.

Mr. Lowell was identified with this phenomenally successful institution

almost from its start. The Massachusetts Institute of Technology was founded in 1861, chiefly through the instrumentality of Prof. William B. Rogers. To the same eminent mind it owed its early success. Measure of the man's executive ability in the first place, its success was in the long run the sign of his forethought in founding it. A school of technology was exactly what the American genius had demanded for many years in vain. It seems strange that no one should have heeded this unmistakable cry of nature before; but men are prone to being thus strangely deaf, till an interpreter arises. For a century the American has been noted for his innate inventiveness and general ingenuity, and has been equally noted for the untrained character of his craft. In some things this did well enough, but in the higher branches it left a good deal to be desired. To supplement natural aptitude with proper training was thus the one thing needful. To think of it was so simple a matter as to require a master mind for the thought. It was a piece of educational acumen of the highest order. And it has borne its inevitable result. But though it was destined to great and permanent success it would be contrary to common sense to suppose that the move was fully appreciated, from the very start. On the contrary, had it not been for its founder the institution would probably have gone under.

After Mr. Rogers' death much came to devolve upon Mr. Lowell; and since then, that is for the last quarter of a century, the policy of the Institute has been intimately associated with him. Elected a member of the corporation in 1873, he was chosen a member of the executive committee in 1883, and was kept upon it to the day of his death. During his term of service were chosen four presidents, and I need only mention the name of General F. A. Walker, who was the longest incumbent, to suggest how wisely made these choices were. But the work of the committee did not end with the selection of the executive; as its name implies, it was itself a part of that executive and its function was continual. As the senior member of the committee Mr. Lowell's force was felt in every portion of the policy pursued. Not a measure was passed which had not been influenced by his opinion. His judicious advice was fully appreciated by General Walker. Indeed the two men were natural complements to each other, General Walker with his brilliant, engaging personality, and Mr. Lowell with his uncommon judgment and invincible determination.

The position taken by the Institute under this leadership is well known. The institution has quadrupled in size, and what is far more important, has more than quadrupled in prestige. It is recognized to-day not only

as the first, but as easily the first, school of technical arts in this country. To it now flock students from the farthest portions of these United States: from Oregon and Texas, from Illinois and Ohio, as well as from New York and Massachusetts. And as graduates they go back again to help develop the country. If any such institution may fairly be called national the Massachusetts Institute of Technology is the one.

Nor is this all. Not confined to the limits of this continent, its fame has successfully invaded lands across the sea. It is not long since Sir Robert Ball informed the writer that it was in advance of anything of the kind in Great Britain; a belief which he had years before acted on by sending his son to it, who is now practising in England. The belief would seem to be spreading; for in June, 1901, examinations for admission to it were held in London. Its rank would seem even to be recognized at home, which means that it probably is of some importance, as the American believes firmly in the *ignota pro magnifico*. The post-graduate course, pursued by the ranking men of the U. S. Naval Academy at foreign institutes heretofore, is in future to be taken at the Institute. It has been the custom of the Academy since 1883 to send the first few scholars of the highest grade, the construction department, abroad to finish their education. At first it was Greenwich they went to, till the British Government ludicrously enough became sensitive to the cadets outstripping their own students and forbade them. Then the Navy sent men to the University of Glasgow, and lastly to the École Polytechnique in Paris, where the recent ones have all graduated. In future it will be in Boston. Evidently the United States Government is convinced of the primacy of the Institute.

What Mr. Lowell's share in this success was may best be gathered from an episode which occurred about a twelvemonth before his death. Feeling himself worn by a painful trouble which he had had for years, he was minded in a moment of acute access of it to give up active work. Accordingly he sent in his resignation to his colleagues of the corporation. They refused to accept it, and the committee did their best to persuade him to reconsider his determination; but in vain. Whereupon a memorial was drawn up, signed by every member of the corporation accessible at the time, protesting against his resignation, and begging him not to withdraw his services from the institution. Such unanimous spontaneity of appreciation in a body of forty odd members is not common. That he was profoundly touched by this mark of confidence and esteem needs no saying.

Of the American Academy of Arts and Sciences he was made a member in 1886. He was first the treasurer and then the vice-president. On the death of Professor Cooke, deeming it fitting that the post of president should be filled by a man of science, he secured the election of Agassiz. When the change into sections was made he became the vice-president of his section, — jurisprudence and literature. He was also a member of the American Association for the Advancement of Science from 1898; of the Massachusetts Historical Society in 1900; of the Colonial Society of Massachusetts from 1898. He died on June 22, 1901. ✓

Such, in brief, was what Mr. Lowell did. Quite as important is what he was. For the man was always behind his measures, as the whole includes the part. His actions were but parcel of himself. Not always is this the case. Some men become noteworthy for what they do, while being notorious for what they are. But with him the act was outcome of the man. He said what he meant and meant what he said. In this unity lay one element of his force. To those with whom he came in contact this oneness with one's self made itself felt. To the world at large, which sees the works but not the workings, his hand in matters which he had brought about often escaped notice. For a certain ingrained aversion to publicity prevented him from putting himself forward. Nothing, however, restrained him from pushing his measures. In consequence, many as were the acts one can point to in his unusually active life, those which actuated others without appearing themselves were more; in consequence also, the world remained in ignorance of the motive cause. For he acted for results; and what is to take effect does not need to make it.

Effect indeed was the very opposite of what Mr. Lowell was in thought or word or deed; and very refreshing it is, like a cool breath of pure air in the artificial heat and closeness of a crowded room, to consider such a character in these days of blatant, forth-putting mediocrity. When to seem is at a premium, and to be at a discount, it is invigorating to turn to a life which owed nothing to adventitious or meretricious aid; a life which not only was fine, but escaped the soiling consequent upon too much mental fingering by the world at large. To be generally in evidence means a loss of that delicacy of distinction, if it means nothing more, which is for so much in beauty of character. But it means usually very much more; it leads inevitably to a substitution of superficiality for solidity, of appearance for reality, of a sinking to a level of one's audience instead of a rising superior to applause. To say that a man owed nothing to effect is to say of him the best that can possibly be said. The natural forces with which we daily come in contact owe nothing to such cause;

on the contrary they stir us all the deeper, if we stop to think, for the very fact that they do not stir us without such thought. We are impressed the more by what seems superior to the impression it makes.

There is, too, another merit in the absence of effect — a gain in effectiveness. It is the greatest compliment to a man's ability that he should succeed without seeming to do so, because it shows that all his force has been massed upon the one strategic point. We are all familiar with this when it is done of intent aforethought.

As potent is the principle when the self-effacement is unconscious. The one obliteration differs from the other only in being instinctive instead of being thought out; and the one is as telling as the other. However it be brought about, the fact that the self is effaced is proof that the work has been done well. For it shows that the result has been brought to pass with the least expenditure of force. Personality causes friction, and evidence of self is therefore proof that force has been uselessly employed. The fact that a man has succeeded in having his idea prevail without forcing himself along with it is sign of the best kind of work.

Now this was the case with Mr. Lowell. It was so because of an unusual combination of characteristics, a singular wedding of energy in deed with dislike of its external trappings.

To an exceptional extent, therefore, Mr. Lowell's distinction lay in character. Three qualities he possessed to an unusual degree, qualities each rare enough as it is: will, ability, and integrity. He was, in the first place, a combination of force and ability as simple and as uncommon as success, which is its immediate consequence. The one is but the necessary premiss to the other's conclusion. If a man be originally possessed of the first he is sure eventually to possess the second. Schopenhauer's definition of the world as all will and representation certainly holds of one part of it, — the affairs of men. If the affairs consist rather in the dealing with men than nature the representation takes the form of words, and may be paraphrased as first the skill to put a thing convincingly and then the will to put it through. Mr. Lowell combined the two qualities.

Will he possessed to the full. He was noted for his determination. To his lot, in consequence, fell many necessary and thankless tasks. He likewise escaped many empty honors. For where he went he worked. No one ever thought of preferring him to a post merely *honoris causa*. For people knew that in getting him they got not a figure-head, but a man who was certain to make himself felt; not because he tried to do so, but because it was in him to do it. He entered concerns not by the postern

gate of popularity, but by the portal of inevitableness. He was chosen because he was necessary. And he stayed for the same reason.

Now will is pure force, uncomplexioned, the mere dynamic outcome of the idea. Its effectiveness to any particular end depends, therefore, upon the character of the idea whose explosive force it is. With Mr. Lowell the idea owed its carrying power to two characteristics: judiciousness in itself and judiciousness in its presentation. In the first place he was apt to be right, that is, to be wise. His judgment of things within his own field was excellent. It was essentially sound. His was that uncommon sense-possession, the possession of common sense. Instinctively his mind worked correctly. It was the exact opposite of the mind of the crank, which may often hit off a brilliant conception, but which is too unsafe to be trusted. With him no one idea ever usurped the right of way to the exclusion of others. Each had its due effect; which fundamental balance makes the only safe foundation for superstructure.

In the next place he was as shrewd as he was sound. He had a keenness for the essential point which almost assured success in advance. Insisting upon what was vital, he waved less important issues to the other side. In this consists the consummation of the art of commerce with one's kind. An instance of the combined breadth and shrewdness of his business insight occurs to my mind. "When I lease a building," he once said to me, "I ask a good price of the tenant and then do all the little repairs he wants. The price makes its impression but once; the perquisites repeatedly, and the latter impressions stand nearer to the falling due of the lease."

Backing up his judgment was his excellence of exposition. His ideas were the more telling for being well told. His words were few and to the point. In a twinkling he would dissect a situation, and with equal terseness suggest its remedy. With ability for audience this had immediate effect; with mediocrity it was rather his tact that told. His logic was too accurate for popular approval, which prefers the coloring of emotion to the lines of thought. For very few men care for truth as they care for their feelings. And Mr. Lowell's forte was not the silver tongue of eloquence, but the more golden gift of statement. He could put a point so that it pierced perception instantly.

Lastly, there was about his advocacy of his measures an impersonality as potent as it was subtly persuasive. It was not that the ideas themselves were what one would call impersonal, but that the idea appeared by itself with so little of that aura of the personal, which in human affairs the man unconsciously throws around it, as to appear to stand alone. For

in Mr. Lowell's case it was as if he were but the mouthpiece of the idea, so heartily did he identify himself with it, and yet so single was his intent. It was the idea he thought of, not of himself. Such a condition tends in a twofold way to conviction; first, by the sincerity of the pleading, and secondly, by the absence so far as is humanly possible, of the antagonism roused by personality.

Recognition of his ability followed any knowledge of him; it did not, as with some men, precede it. Those qualities compounded of sociability and forth-puttingness, however unintentional, which make for instant distinction among one's fellows, were not his by nature. His abilities were solid, not showy. Nor was it his bent to go out of his way in the road we all travel to make a new path. He neither courted position nor shirked it. When it once fell to him he became as it were the office. Nothing was ever done by him for his own sake, however incidentally. He seemed simply to embody his trust. In intent he was singularly single. Indeed, in describing his action I find it difficult to convey the combination of self-obliteration and of self-sufficiency in its best sense, which he was. For the character is uncommon. One often witnesses self-abnegation. But it is usually wedded to weakness. Or, on the other hand, one sees strength associated with self-seeking. Few men are essentially impersonal enough to strive strenuously for the thing in itself, as if it were a person. He did.

This was perhaps the stranger that his mental makeup was not of the abstract but of the distinctly concrete kind. In practical, not in theoretical matters, he was great. Widely read as he was he never seemed to care to theorize. He enjoyed highly the theories of others, when they did not collide with the puritanism which, as I have said, he inherited doubly distilled. Even this was perhaps as much due to the society in which he had been brought up. He was educated before the modern movement in thought took place, and Boston of sixty years ago was even behind the rest of the world in this stirring of the waters of stagnation. Not in knowledge nor in intellect; it was in cast of mind he differed. His preference was for action. Of this he never tired. To recreation he was less given. Such as he took was of a serious kind. He was a member of the Wednesday Evening Club, of the Thursday Evening Club, and of a class dinner club; but clubs which consist but of a local habitation and a name he never cared to join. Loafing and he were strangers.

Will and the power of representation were, as I have said, two of his attributes. But the second of these should, though it often does not, include a quality which is itself fundamental to all character, and which

Mr. Lowell possessed to the utmost — the quality of honesty. In these days, when successful financial operations so often depend upon will and *misrepresentation*, it is no small thing to say of a successful man of affairs that he was conspicuously honest. When to steal enough is to steal with credit, it is cheering to see business triumph attendant on unimpeachable integrity. And this was typically true of him. Honest he was by essence. Verity was of the very fibre of his being.

Nor is it only of the grosser form of that attribute which has usurped the generic name of honesty of which I would speak, but of that finer sense of fair dealing which we include under the appellation of a just man. His uprightness was perfectly well known. No adversary ever questioned that. A tribute to the fact once came in an amusing manner to Mr. Lowell's ears in one of the latter years of his life. He was passing through a railway station in Boston one afternoon when he chanced to overhear two men unknown to him discussing his character. It was his own name that caught his attention. "Augustus Lowell," said one, "is a hard man, but he is absolutely honest." "Yes," said the other, "he is emphatically that." It is not often that one overhears a bit of one's own obituary during one's life, nor is made privy to concurrent testimony on the subject from both sides of a discussion. As to the hardness imputed to him, it had no foundation in fact, though it was often attributed to him by people who knew him only from the outside. A cast of countenance which looked stern when in repose, and which was purely a matter of feature, was chiefly responsible for the reputation. He was quite aware of the look himself, as well as of that to which it was due. As a matter of fact he was very tender-hearted, singularly so for a man of his determination. Few suspected him of the kindnesses he was constantly doing, so unostentatiously were they performed, and almost no one credited him with the affection he felt.

The complexion of his character — for will is an uncomplexioned force — may be described in one word: exactness. Accuracy of statement and honesty of purpose are both but facets of a crystallization of thought. A man who sees clearly must be honest by instinct if he be not dishonest by intent. There is with him no limbo of self-deception. Much of the untruth current in the world is due to an initial haziness of conception subsequently seized upon and distorted to its own ends by passion, without disquiet to the perpetrator, because unrecognized as distortion by him. Mr. Lowell was essentially exact. His nature therefore imposed honesty. He saw much too correctly either to jumble or to juggle with his thoughts.

Important as the qualities he possessed are to the making of a man, they are no less so to the making of a community. And in any constitutional country no small part of the value of a man lies in his value as a citizen. Indirect as well as direct his influence may be, and with universal suffrage the former is apt to be the case with the best men. To be determined, discerning, and honest does not, unfortunately, in our system of supposed political equality, lead to purely civic distinction. For the choice of a popular suffrage cannot rise above its source. But if the qualities do not lead to civic distinction for their possessor they do something as enduring, — they tend to raise to his level the community of which he forms a part. For without the first attribute, nothing is possible; without the second, foolishness; without the third, knavery. The apathy of most of us, the crankiness of a few, and the financial trickery of others, are the several results of the absence of these qualities.

Too strong a personality to be generally popular, recognition of such a character is slow. For we are all prone to praise what we like. Only when distance does away with personal perspective do men, like hills, reveal their height.

Posterity gives the final judgment. For posterity judges of a man's worth unhaloed by the engaging lack of it, and sets the seal of its appreciation upon those who have contributed to the world's advance and incidentally to posterity's own existence. To make for this advance is the best any man can do, and to this end to be determined, discerning, and honest is one of the surest means. If a man possess these attributes he will not have lived in vain.

PERCIVAL LOWELL.

TRUMAN HENRY SAFFORD.

TRUMAN HENRY SAFFORD was born January 6, 1836, at Royalton, Vermont. The course of his life was determined by a phenomenal capacity for the mental solution of arithmetical problems, which began to display itself when he was only six years old. This faculty, which might under easily conceivable circumstances have been wasted in mere display for the amusement of the curious, fortunately attracted the attention of judicious and eminent men, and thus secured for him the advantages of a thorough education. He graduated at Harvard College in the class of 1854, which he joined at the beginning of its Junior year. As a boy he had computed an almanac, and given other evidences of interest in astronomy, and capacity for it; and immediately after his graduation he

obtained employment at Harvard College Observatory, where he continued for nearly twelve years. He married Elizabeth M. Bradbury, of Cambridge, in March, 1860, "on six hundred dollars a year," as he once told the writer of this notice; for astronomy has never been a promising road to riches for young Americans insufficiently endowed with the practical turn of mind generally regarded as characteristic of their countrymen. He was elected Fellow of the Academy, Nov. 13, 1861.

Safford's position at Cambridge, if not pecuniarily advantageous, offered him in some other respects greater advantages than, perhaps, he could secure in later life; for he had here comparatively few hindrances to the undisturbed development of his scientific abilities. Accordingly, the results of his work soon began to make him widely and favorably known in astronomical circles. One of the most generally interesting of these investigations related to the orbital movement of Sirius. Many years before, the observed want of uniformity in the proper motion of this star had led astronomers to the belief that it formed one of a system of bodies revolving about a common centre of gravity; its companion, or companions, as the case might be, being too faint to be visible, at least with the existing instrumental means. Still more recently, the character of the supposed revolution of Sirius had been discussed by means of its right ascensions, as observed at different times. Safford now undertook a similar discussion of its observed declinations, and after combining the result of this work with that previously found, on the supposition that only one disturbing body occasioned the observed effects, was able to indicate its direction from Sirius at the time, in excellent agreement with the actual place of the companion discovered almost simultaneously by the younger Alvan Clark.

A catalogue of the declinations of five hundred and thirty-two stars, intended for use in the government survey of the lake region, was prepared by Safford during his connection with Harvard College Observatory, and probably marks the beginning of the geodetic work which occupied a large part of his time in later years.

In 1863 he received the formal title of Assistant Observer; and two years later, upon the death of Professor G. P. Bond, he was placed in charge of the Observatory. At this time, he completed and prepared for publication Professor Bond's researches on the nebula of Orion, which appeared as Volume V. of the Observatory Annals. Volume IV. of the same series is also the work of Safford. The first part, dealing with the preparation of a list of fundamental stars for transit observations, was published in 1863. By means of these fundamental stars, the right as-

censions of five hundred and five stars were determined by observations in the years 1862 to 1865; the second part of the volume, containing the result of this work, appeared in 1878.

In 1866 Safford was appointed director of the Dearborn Observatory at Chicago, which had recently been provided with the large refracting telescope, by means of which, while still in its maker's hands, the companion of Sirius had been discovered. This position, with which was connected a professorship of astronomy in the University, seemed to offer the fairest prospect of permanent and congenial employment to its occupant; but the disastrous fire which destroyed so large a part of Chicago in 1871 deprived the Observatory of the financial support upon which its activity depended. Professor Safford, accordingly, now found it necessary to maintain his family by geodetic work connected with the government surveys. He had undertaken the observation of one of the zones of stars distributed among various observatories under the general system arranged by the *Astronomische Gesellschaft*; but this, and other pieces of work begun at Chicago, were now necessarily laid aside.

In 1876, however, Professor Safford was restored to his favorite pursuits by appointment to the chair of astronomy at Williams College. In this position, teaching required much of his time, and of course largely impeded his attention to scientific investigation; he also acted as librarian of the College, and was at times engaged in other business connected with its administration. It is not probable that he felt the work of instruction to be a burden; on the contrary, he took great interest in the subject of pedagogy, which he studied theoretically as well as practically. Notwithstanding all hindrances to the pursuit of strictly astronomical research, he accomplished much in that direction during the years spent at Williamstown, devoting himself largely, as before, to the subject of accuracy in the determinations of the positions of fixed stars. One of the principal results of this work was the publication (in the *Proceedings of this Academy*, Volume XIX.) of a catalogue of the mean right ascensions of one hundred and thirty-three stars near the north pole; but many other articles in scientific periodicals, particularly the *Monthly Notices of the Royal Astronomical Society*, attest Professor Safford's perseverance and success in scientific work during his later years.

He died June 13, 1901, at Newark, New Jersey, where he was residing at the time with one of his sons. A stroke of paralysis, three years previously, had put an end to his activity in science. His widow, with four sons and a daughter, survives him.

ARTHUR SEARLE.

HORACE ELISHA SCUDDER.

It is a merit of the American Academy of Arts and Sciences that it does not limit itself to one form of intellectual pursuits, as do the merely historical or scientific societies or even some which share the name of Academy. It also has the merit that it is ready to recognize the various subdivisions of each pursuit, and has a place of honor for every such department. Intellectual self-respect is to be found only in honoring every form of work in its place. It has been generally felt, I think, that no disrespect was shown to our late associate, John Fiske, when the *New York Nation* headed its very discriminating sketch of him with the title "John Fiske, Popularizer;" and in speaking of another late associate who has left us, I should feel that I showed no discourtesy, but on the contrary, did him honor in describing him as Horace Elisha Scudder, Literary Workman. I know of no other man in America, perhaps, who so well deserved that honorable name; no one, that is, who if he had a difficult piece of literary work to do could be so absolutely relied upon to do it carefully and well. Whatever it was, compiling, editing, arranging, translating, indexing, — his work was uniformly well done. Whether this is the highest form of literary distinction is not now the question. What other distinction he might have won if he had shown less of modesty or self-restraint, we can never know. It is certain that his few thoroughly original volumes show something beyond what is described in the limited term, workmanship. But that he brought simple workmanship up into the realm of art is as certain as that we may call the cabinet-maker of the middle ages an artist.

Mr. Scudder was born in Boston on October 16, 1838, the son of Charles and Sarah Lathrop (Coit) Scudder; was a graduate of Williams College and after graduation went to New York, where he remained for three years engaged in teaching. It was there that he wrote his first stories for children, entitled "Seven Little People and Their Friends" (New York, 1862). After his father's death he returned to Boston and thenceforward devoted himself almost wholly to literary pursuits; prepared the "Life and Letters of David Coit Scudder" his brother, a missionary to India (New York, 1864); edited the "Riverside Magazine" for young people during its four years' existence (from 1867 to 1870); and published "Dream Children" and "Stories from My Attic." Becoming associated with Houghton, Mifflin and Company he edited for

them the *Atlantic Monthly Magazine* from 1890 to 1898, preparing for it also that invaluable index, so important to bibliographers; he also edited the "American Commonwealth" series, and two detached volumes, "American Poems" (1879) and "American Prose" (1880). He published also the "Bodley Books" (8 vols. Boston, 1875 to 1887); "The Dwellers in Five Sisters' Court" (1876); "Boston Town" (1881); "Life of Noah Webster" (1882); "A History of the United States" for schools (1884); "Men and Letters" (1887); "Life of George Washington" (1889); "Literature in School" (1889); "Childhood in Literature and Art" (1894), besides various books of which he was the editor or compiler only. He was also for nearly six years (1877-82) a member of the Cambridge School Committee; for five years (1884-89) of the State Board of Education; for nine years (1889-98) of the Harvard University visiting committee in English literature; and was at the time of his death a trustee of Williams College, Wellesley College, and St. John's Theological School, these making altogether a quarter of a century of almost uninterrupted and wholly unpaid public service in the cause of education. Since May 28, 1889, he was a member of this Academy, until January 11, 1902, when he died. This is the simple record of a most useful and admirable life, filled more and more, as it went on, with gratuitous public services and disinterested acts for others.

As a literary workman, his nicety of method and regularity of life went beyond those of any man I have known. Working chiefly at home, he assigned in advance a certain number of hours daily as due to the firm for which he labored; and he then kept carefully the record of these hours, and if he took out a half hour for his own private work, made it up. He had special work assigned by himself for a certain time before breakfast, an interval which he daily gave largely to the Greek Testament and at some periods to Homer, Thucydides, Herodotus, and Xenophon; working always with the original at hand and writing out translations or commentaries, always in the same exquisite handwriting and at first contained in small thin note-books, afterwards bound in substantial volumes, with morocco binding and proper lettering. All his writings were thus handsomely treated, and the shelves devoted to his own works, pamphlet or otherwise, were to the eye a very conservatory and flower garden of literature; or like a chamberful of children to whom even a frugal parent may allow himself the luxury of pretty clothes. All his literary arrangements were neat and perfect, and represented that other extreme from that celebrated collection of De Quincey in Dove Cottage at Grasmere, where that author had five thousand books, by

his own statement, in a little room ten or twelve feet square; and his old housekeeper explained it to me as perfectly practicable "because he had no bookcases," but simply piled them against the walls, leaving here and there little gaps in which he put his money.

In the delicate and touching dedication of Scudder's chief work "Men and Letters" to his friend Henry M. Alden, the well known New York editor, he says: "In that former state of existence when we were poets, you wrote verses which I knew by heart and I read dreamy tales to you which you speculated over as if they were already classics. Then you bound your manuscript verses in a full blue calf volume and put it on the shelf, and I woke to find myself at the desk of a literary workman." Later, he says of himself, "Fortunately, I have been able for the most part to work out of the glare of publicity." Yet even to this modest phrase he adds acutely: "But there is always that something in us which whispers *I*, and after a while the anonymous critic becomes a little tired of listening to the whisper in his solitary cave, and is disposed to escape from it by coming out into the light even at the risk of blinking a little, and by suffering the ghostly voice to become articulate, though the sound startle him. One craves company for his thought, and is not quite content always to sit in the dark with his guests."

The work in which he best achieves the purpose last stated is undoubtedly the collection of papers called by the inexpressive phrase "Men and Letters;" a book whose title was perhaps a weight upon it and which yet contained some of the very best of American thought and criticism. It manifests even more than his "Life of Lowell" that faculty of keen summing up and epigrammatic condensation which became so marked in him that it was very visible, I am assured, even in the literary councils of his publishers, two members of which have told me that he often, after a long discussion, so summed up the whole situation in a sentence or two that he left them free to pass to something else. We see the same quality for instance in his "Men and Letters," in his papers on Dr. Mulford and Longfellow. The first is an analysis of the life and literary service of a man too little known because of early death, but of the rarest and most exquisite intellectual qualities, Dr. Elisha Mulford, author of "The Nation" and then of "The Republic of God." In this, as everywhere in the book, Mr. Scudder shows that epigrammatic quality which amounted, whether applied to books or men, to what may be best described as a quiet brilliancy. This is seen, for instance, when in defending Mulford from the imputation of narrowness, his friend sums up the whole character of the man and saves a page of more detailed discussion by say-

ing, "He was narrow as a cañon is narrow, when the depth apparently contracts the sides" (page 17). So in his criticism called "Longfellow and His Art," Scudder repeatedly expresses in a sentence what might well have occupied a page, as where he says of Longfellow, "He was first of all a composer, and he saw his subjects in their relations rather than in their essence" (page 44). He is equally penetrating where he says that Longfellow "brought to his work in the college no special love of teaching," but "a deep love of literature and that unacademic attitude toward his work which was a liberalizing power" (page 66). He touches equally well that subtle quality of Longfellow's temperament, so difficult to delineate, when he says of him: "He gave of himself freely to his intimate friends, but he dwelt, nevertheless, in a charmed circle, beyond the lines of which men could not penetrate" (page 68). These admirable statements sufficiently indicate the rare quality of Mr. Scudder's work.

So far as especial passages go, Mr. Scudder never surpassed the best chapters of "Men and Letters," but his one adequate and complete work as a whole is undoubtedly, apart from his biographies, the volume entitled "Childhood in Literature and Art" (1894). This book was based on a course of Lowell lectures given by him in Boston, and is probably that by which he himself would wish to be judged, at least up to the time of his admirable "Biography of Lowell." He deals in successive chapters with Greek, Roman, Hebrew, Mediaeval, English, French, German, and American literary art with great symmetry and unity throughout, culminating, of course, in Hawthorne and analyzing the portraits of children drawn in his productions. In this book one may justly say that he has added himself, in a degree, to the immediate circle of those half dozen great American writers whom he commemorates so nobly at the close of his essay on "Longfellow and his Art," in "Men and Letters." "It is too early to make a full survey of the immense importance to American letters of the work done by half a dozen great men in the middle of this century. The body of prose and verse created by them is constituting the solid foundation upon which other structures are to rise; the humanity which it holds is entering into the life of the country, and no material invention, or scientific discovery, or institutional prosperity, or accumulation of wealth will so powerfully affect the spiritual well-being of the nation for generations to come" (p. 69).

If it now be asked what prevented Horace Scudder from showing more fully this gift of higher literature and led to his acquiescing, through life, in a comparatively secondary function, I can find but one explanation, and that a most interesting one to us in New England as illustrating

the effect of immediate surroundings. His father, so far as I can ascertain, was one of those Congregationalists of the milder type who, while strict in their opinions, are led by a sunny temperament to be genial with their households and to allow them innocent amusements. The mother was a Congregationalist, firm but not severe in her opinions; but always controlled by that indomitable New England conscience of the older time which made her sacrifice herself to every call of charity and even to refuse, as tradition says, to have window curtains in her house, inasmuch as many around her could not even buy blankets. Add to this the fact that Boston was then a great missionary centre, that several prominent leaders in this cause were of the Scudder family and the house was a sort of headquarters for them, and that Horace Scudder's own elder brother, whose memoirs he wrote, went as a missionary to India, dying at his post. Speaking of his father's family in this memoir, he says of it, "In the conduct of the household, there was recognition of some more profound meaning in life than could find expression in mere enjoyment of living; while the presence of a real religious sentiment banished that counterfeit solemnity which would hang over innocent pleasure like a cloud" (Scudder's *Life of David Coit Scudder*, p. 4). By one bred in such an atmosphere of self-sacrifice, that quality may well be imbibed; it may even become a second nature, so that the instinctive demand for self-assertion may become secondary until a man ends in simply finding contentment in doing perfectly the appointed work of every day. If we hold as we should that it is character, not mere talent, which ennobles life, we may well feel that there is something not merely pardonable, but ennobling in such a habit of mind. Viewed in this light, his simple devotion to modest duty may well be to many of us rather a model than a thing to be criticised.

THOMAS WENTWORTH HIGGINSON.

JOSEPH HENRY THAYER.

JOSEPH HENRY THAYER was born in Boston, November 7, 1828. He graduated from Harvard in 1850, spent one year (1854-55) in the Harvard Divinity School, graduated from the Andover Theological Seminary in 1857, and was minister of the Crombie Street Church in Salem from 1859 to 1864; a part of this time, from September, 1862 to May, 1863, he served as Chaplain of the Fortieth Infantry Regiment of Massachusetts Volunteers. His career as teacher began in 1864,

when he became Professor in the Andover Theological Seminary. Resigning his chair in 1882, he came to Cambridge, was Lecturer in the Harvard Divinity School for the year 1883-84, and in 1884, on the death of Ezra Abbot, succeeded him as Bussey Professor of New Testament Criticism and Interpretation; this position he held up to 1901. He was a member of the Harvard Corporation from 1877 to 1884. He was elected a Fellow of the American Academy of Arts and Sciences March 9, 1887, and, though not an active member, was always deeply interested in the work and fortunes of the Academy. Other societies to which he belonged are the Archaeological Institute of America, the American Oriental Society, and the Society of Biblical Literature. He received the degree of A.M. from Harvard, the degree of S.T.D. from Yale, Harvard, and Princeton, and the degree of Litt.D. from Dublin.

Dr. Thayer chose as his field of study the grammar and lexicography of the New Testament, and his distinguished services in this department have been universally recognized in Europe and America. He brought to his task wide learning, patience in investigation, minute accuracy in details, and critical acumen. His "Greek-English Lexicon of the New Testament" will long remain a manual for students and a monument of erudition and industry. The statement on the title-page, that it is a "revised and enlarged translation" of a German lexicon (Grimm's *Wilke*), hardly conveys a correct impression of its character. In fact the increase of the breadth and precision of definitions, the verification of references, the addition of further references, and the construction of the New Testament text from the best manuscript authorities, entailed an amount of labor almost equivalent to the production of an independent lexicon. This breadth of research and exactitude of statement characterized all his scientific work — his articles in the Bible Dictionaries of Smith and Hastings, his translation of the New Testament Greek grammars of Winer and Buttmann, and his work on the Revised Version of the New Testament. To this last he gave many years of labor, as a member of the American Committee collaborating with the English Committee, and as principal editor of the American Version (the English Version with the changes introduced by the American Committee), which by agreement with the English Committee was published last year. His reading in his chosen field was wide and critical. He found time amid pressing professional and editorial duties to keep up with the enormous mass of New Testament literature that every year produced in Europe and America, and to form well-defined opinions as to its value.

He was not only singularly precise in details, he had a marked capacity for organization. He conceived large plans, and worked them out with patience and success. As early as 1864 he announced his purpose to translate Grimm — he completed the translation in Cambridge in 1885. It is mainly to him that we owe the establishment of the American School of Oriental Research in Jerusalem. Year after year he set forth the desirableness and the feasibility of such a school, and by unwearied exertions secured the indorsement of the Society of Biblical Literature and of the American Oriental Society, and the coöperation and financial support of a number of colleges, and of the Archaeological Institute of America. The school went into operation in the year 1900, and seems certain to give an impulse to Oriental study in this country, and to increase our knowledge of Oriental (especially Semitic) life, ancient and modern.

Dr. Thayer was an enthusiastic teacher, ever ready to give sympathy and time to his students. He was exacting in his demands, had small patience with negligence, and refused to lower his standards on any personal grounds, such as lack of previous preparation, or sickness; but he knew how to encourage and assist backward students, and to stimulate all by his own sense of the requirements of scholarship. He held firmly to the traditional New England standard of a minister's outfit, insisting on the necessity of Hebrew and Greek for the preacher. This point was the subject of debate in the Harvard Divinity Faculty for years, and the final decision made it possible for a student to take the degree of Bachelor of Divinity without a knowledge of Hebrew or Greek, the Faculty reserving the right, however, to pass on every individual case. In point of fact, it is true, in the past thirty years at least, only one man without Greek had received the degree, and he was a Japanese, from whom critical study of the Chinese classics was accepted in lieu of Greek. But Dr. Thayer, seeing that the Hebrew requirement was practically given up, believed there was danger that the Greek requirement would go the same way. Against this disposition to dispense with the original languages of the Bible he set his face steadfastly; he lost no opportunity to protest against what he regarded as a lamentable lowering of the standard of ministerial learning. When the question was finally decided, he, of course, accepted in good faith the action of the Faculty. Accept it cordially he could not: he was not an easy-going man, willing to fall in gracefully with the opinions of the majority; on the contrary, he took things very seriously, and, in matters that interested him, expressed himself pointedly. To the last he never spoke of the attitude of the Faculty

toward the Hebrew and Greek requirements without a word of emphatic distrust and condemnation.

His thinking was notably clear-cut — he could not abide haziness. This trait, which is prominent in his scholarly work, appears also in his theological views. He was not intolerant of other men's opinions; he only held tenaciously to his own opinions, and claimed the right to define his position precisely. When he found, in 1882, that he could not subscribe the Andover Creed as it was then interpreted by the governing boards, he resigned his professorship in the Seminary — a sundering of old ties that gave him great pain. His own creed was distinct, yet catholic; he held firmly to certain principles and facts that he believed to be fundamental, and among these he gave a prominent place to scientific truth and personal experience.

Born and brought up in Boston, his traditions and training were those of New England, modified, however, by travel in foreign countries, and by a wide knowledge of men and things. He was a scholar and a man of affairs, a Puritan and a man of the world. In personal intercourse he showed an engaging frankness and friendliness, and the same devotion that appears in his scholarly undertakings manifested itself in his relations with his friends, for whom he was always ready to do the uttermost. He was fortunate in retaining his physical soundness and vigor up to a few months before his death. His erect carriage, alert step, and cheery manner gave him, even in his last years, a remarkably youthful appearance, and his bodily alertness was in keeping with his mental activity. His literary career extended over forty years, apparently without diminution of interest. He had the great happiness of seeing his main undertakings brought to a successful completion — the Greek lexicon, the revision of the English New Testament, and the establishment of the Jerusalem School.

At the close of the year 1900-01 he resigned his position in Harvard, and was made Professor Emeritus. The following summer he spent in Europe, and, returning to America, died in Cambridge after a short illness, November 26, having not long before passed his seventy-third birthday.

C. H. Toy.

JOHN FISKE.

On the 4th of July, 1901, John Fiske, philosopher, lecturer, and historian, died at Gloucester. On the morning of the fifth, hundreds of obituary notices of this distinguished man were read in the daily newspapers from Maine to Texas, from the Atlantic to the Pacific, and even across the water in the capital of Great Britain, by a public familiar, through his ministrations on the platform, with his giant form and ruddy countenance. These preliminary notices were followed at a later date by biographical and critical articles treating of his career, more finished in style and more analytical in character, in reviews and magazines; in weekly, monthly, and quarterly publications. Many of these were characterized by a familiarity with the details of Mr. Fiske's early life, unusual under such circumstances, but easily to be accounted for, since his biography had been partially written during his lifetime by two competent authors.

The first of these sketches, and in some respects the more complete of the two, was published by Edwin D. Mead, in the "Christian Register," in a series of papers occasioned by an address by Mr. Fiske before the Concord School of Philosophy in 1886. The second was by the late Horace E. Scudder, and appeared in a sort of introduction to one of the editions of "The War of Independence." The striking similarity of these biographies extends even to the language used, and indicates a common origin. It is certain that Mr. Fiske himself furnished the material for Mr. Mead's sketch, and there can be but little doubt that he did the same by Mr. Scudder. This will fully explain the points of coincidence, and will also give to both the authoritative character, which neither in words claims, of being practically autobiographical.

From these sketches we learn that on the 30th of March, 1842, there was born in Hartford, Connecticut, to Edmund Brewster Green and Mary Fiske Green, a son named by them Edmund Fiske Green, the greater part of whose child life was spent in Middletown, Connecticut. This Edmund Fiske Green was our John Fiske, his name having been changed during boyhood to that borne by his maternal grandfather.

At an early age the wonderful precocity of the child foreshadowed the marvellous attainments of his later years. His education was carried on first in the lower schools at Middletown and later at Stamford. Then he returned to Middletown and was placed in a private school, after which he went to Cambridge. Meantime he seems to have browsed

in a library in the family mansion, and to a great degree taught himself much that is acquired with difficulty by persons of ordinary intellect even when assisted by the best of masters.

In his "Dutch and Quaker Colonies," Mr. Fiske says of James Logan: "He was an infant prodigy; at the age of twelve his attainments in Greek, Latin, and Hebrew had attracted much notice, and he afterward obtained distinction in modern languages, mathematics, physics, and natural history." The story of Logan's precocity is fairly eclipsed by Fiske's own record, but what he says of Logan shows us what his dispassionate judgment was as to his own childhood career. Fiske's biographers recapitulate his progress from year to year. It is needless to give in full detail the story of his prodigious acquisitions. Suffice it to say, that when six years old he began the study of Latin, and at the age of seven he amused himself by reading Cæsar, and found entertainment in such authors as Rollins and Josephus, and in the perusal of Goldsmith's Greece. The taste for history thus disclosed led him on to the works of other authors, and before he was eleven years old he had not only devoured many histories of divers peoples, but had from memory filled a quarto blank-book of sixty pages with chronological tables of events between 1000 B. C. and 1820 A. D. By the time he was thirteen he had read the greater part of the writings of about a dozen Latin authors, the work thus accomplished being in fact more than would be required in that line of a graduate at Harvard. Meantime, mathematics had not been neglected. Beginning with algebra at the age of eight, he had, by the time he was thirteen, gone through Euclid, plane and spherical trigonometry, surveying and navigation, and analytical geometry, and had made a good start in differential calculus.

Until he had mastered Latin sufficiently to make use of a Greek lexicon in which the meanings were given in Latin, he could not take up Greek, a lexicon of this description being the only one at his command. So trifling a discouragement as that did not long delay him. As soon as he felt competent to make use of the means at hand, he entered upon the study of Greek, and even before he obtained a modern lexicon he made considerable progress in his knowledge of the language. With the facility for study gained through the acquisition of a suitable key to the meanings of the words, he reached such proficiency, at the age of fifteen, that he could read Plato and Herodotus at sight.

He began his philosophical studies at the age of eleven with Locke's "Essay of the Understanding," and at fourteen himself wrote an essay on the habitability of the planets, in which he made the point that

Jupiter and Saturn, owing to their great size and slow refrigeration, are in a much earlier stage of development than Venus, Mars, and the Earth.

His taste for philology led him to attack the modern languages at the age of fifteen. He began with German; took up Spanish, in which he kept a diary; conquered French; and then attacked Italian. At the end of six months he had read the whole of Giuccardini, with parts of Ariosto and Petrarch. He then turned his attention to Portuguese.

We have followed him as a boy down to the time when he is about to leave home to go to Cambridge. What had college to offer him in the way of instruction? It is true that in much of the work he had performed he had been without a master, and of course there was much that he might still learn, but clearly the regular curriculum would practically be merely review work for him. Nevertheless, he looked forward with yearning to the time he should spend at Harvard, knowing that he could discover avenues in which the extraordinary mental activity which had impelled him along this wonderful path of study could find exercise.

We are told that until he was sixteen "he averaged twelve hours study daily for twelve months in the year." With the qualifications which will naturally suggest themselves this statement would seem probable, yet this boy who could cope with problems which present difficulties to the ordinary collegiate student, and whose learning at fifteen years of age far exceeded in many directions the standard which we should set for a cultivated man of maturity, found time for other occupations than delving in books. He taught himself to play upon the piano; participated in out-of-door sports, and took pleasure in walking, riding, and boating upon the Connecticut. He was much interested in church and oratorio music, was a member of the church choir, and his fondness for choral music, then developed, is said to have abided by him throughout life. We do not find evidence that works of fiction had much attraction for him as a boy. Later in life, we know that he was fond of novels, and that the characters portrayed by the masters of fiction were as real to him as the heroes with whom he met in history. His reading at this time must have been controlled by his surroundings, and what the libraries at his command furnished we can conjecture from the list of his acquirements. He gives us a hint of what there was at hand for him to read, in addition to what might be termed "useful books," in the following: "I remember," he says in one of his essays, "that when I was about ten years old, a favorite book with me was one entitled 'Criminal Trials of all Coun-

tries by a Member of the Philadelphia Bar.' I read it and read it, until forbidden to read such a grewsome work, and then I read it all the more."

He also tells us that he had access to a few scientific books owned by a strange character in Middletown, a sort of hermit; a dabbler in biology and geology, who led a solitary life; immersed, apparently, in studies and speculations concerning things far above his stage of cultivation. In the curious den — the library, workshop, and probably living room also — of this friendly recluse, among stuffed birds, mounted animals, strange creatures preserved in alcohol, specimens of fossil foot-prints from the Connecticut sandstone, and a few books on the subjects in which the owner was interested, the learned boy was admitted as a privileged guest, and here he talked with his strange companion concerning the surrounding objects, and from his host young Fiske borrowed such of the books as he cared to read.

The future author of "Outlines of a Cosmic Philosophy" and "Through Nature to God," was at this time a teacher in the Sunday-school and was active at prayer-meetings. What it cost him to reach the frame of mind which could put forth these works is substantially set forth in his Cosmic Philosophy. "A person," he says, "is educated in an environment of Presbyterian theology, accepting without question all the doctrines of Calvinism. By and by his environment enlarges. Facts in science or in history, methods of induction, canons of criticism present themselves to his mind as things irreconcilable with his old creed. Hence painful doubts, entailing efforts to escape by modifying the creed to suit new mental exigencies. Hence eager study and further enlargement of the environment, causing fresh disturbance of equilibrium and renewed doubt, resulting in further adaptation. And so the process continues, until, if the person in question be sufficiently earnest and sufficiently fortunate, the environment enlarges so far as to comprehend the most advanced science of the day, and the process of adaptation goes on until an approximate equilibrium is attained between the order of conception and the order of phenomena, and scepticism, having discharged its function, exists no longer, save in so far as it may be said to survive in the ingrained habit of weighing evidence and testing one's hypotheses." Elsewhere, and this time speaking in the first person singular, he refers to his early religious opinions as being based upon the fear of the "burning hell with which my childish imagination had been unwisely terrified."

He entered the sophomore class at Harvard in 1860 at the age of

eighteen, and was graduated in 1863. His study of the modern languages, which as we have seen already comprehended nearly all those in use in Eastern Europe, was followed by an attack on the ancient tongues, Hebrew and Sanskrit; the former before he entered college, the latter after he reached Cambridge. While in college he is said to have worked from twelve to fifteen hours each day, during vacations as well as terms, his time being divided between comparative philology, ancient and modern history, and modern literature. His philological studies at this period comprehended the Icelandic, Gothic, Danish, Swedish, Dutch, and Roumanian tongues, and an attack on the Russian.

"He was but a lad of seventeen," says one of his eulogists, "when Darwin's great work appeared and aroused in him the zeal that determined his mental activity for more than a score of years." Mr. Mead, in his sketch, gives a long list of the authors whose books were read in prosecution of the study thus kindled, and adds that Fiske's training was that of a literary character even when he studied science. It is perhaps unnecessary to recapitulate the names of these writers. Every page of the *Cosmic Philosophy* bears evidence of Fiske's extensive researches at this time, and apart from the fact that he is avowedly preaching the doctrines of Spencer, it is clear that the scientific work upon which his reasoning is based does not claim to be original. He had not prosecuted laboratory researches in chemistry or biology; he had not gained his knowledge of astronomy at the observatory; he simply made skilful use of that which was done by others, never claiming for himself more than was his due.

While still an undergraduate he published two papers. The first, in 1861, was entitled *Mr. Buckle's Fallacies*; the second, in his senior year, was an essay on the *Evolution of Language*. The latter is said to have attracted the attention of Mr. Spencer, and thus laid the foundation for the intimate friendship which afterwards existed between Fiske and himself.

After his graduation, Mr. Fiske entered the Harvard Law School, and in 1865 took his degree of LL.B. In 1864, while a member of the Law School, he was admitted to the Suffolk bar, and in September of that year he married Abby Morgan Brooks of Petersham. After receiving his degree from the Law School, he opened an office in Boston and entered upon the practice of his profession. It is said that his prospects at the bar were fairly good, but he found professional work distasteful, and in about a year abandoned his office. In thus closing the door to a possible success in the profession which he had

chosen, and taking upon himself the chance of supporting his family through the precarious channels of literary contributions to newspapers and magazines, there is a touch not only of the simple faith and optimism of youth, but of the Bohemian indifference to money-matters characteristic of the John Fiske whom we knew in later years. His confidence in himself was apparently justified by the result, for by some means or other, then and ever after, he was able to keep the wolf away from the door, and in an easy and comfortable style of living to support his family. It is evident, however, that at a later period he realized the boldness of the step then taken. "Literature as a profession," he said to an interviewer a few years ago, "looked as precarious in that generation as it does to you in this, but by the time I was four years out of college I managed by constant labor to earn enough by my pen to keep house and support a small family. . . . I wrote at first for the magazines and newspapers . . . upon science and philosophy and literature, and I sometimes wrote political leaders. . . . I earned more by my review work and historical and literary studies than I thought was possible when I stood upon the brink; but an intellectual revolution will be necessary before my experiences and that of my generation can be repeated by the young men who are looking towards literature to-day."

In 1868, he published a little book called "Tobacco and Alcohol. It does pay to Smoke — The Coming Man will Drink Wine." In this he criticised the hasty and unscientific writings of James Parton on the same subject, and as a reviewer states, "clearly developed" "the fundamental principle that everything in diet and medication depends on the dose."

He was appointed, in 1869, as Lecturer on Positive Philosophy at Harvard, which place he filled for two years. During the second half of 1869 he was also an Instructor of History, and from 1872 to 1879 he was Assistant Librarian. In 1885 he received the appointment as Professor of American History at Washington University, St. Louis. The duties of this position were fulfilled by the delivery there of occasional courses of lectures. During 1895-96 he was Lecturer at Harvard on the Campaigns of the Civil War west of the Alleghanies, and was also during 1896-97 Lecturer on Colonial Virginia and other Southern Colonies. He was elected an Overseer of Harvard in 1879, again in 1885, and a third time in 1899. He took his A.M. at Harvard in course, and in 1894 received the honorary degree of LL.D. The same year the University of Pennsylvania gave him the degree of Litt.D. He was a

Fellow of the Academy and a Member of the Massachusetts Historical Society.

The character of the thoughts which occupied his mind for nearly twenty years after his graduation is shown by the publications which rapidly followed. In 1872 we have "Myths and Myth Makers;" in 1874, "Outlines of Cosmic Philosophy;" in 1876, "The Unseen World and Other Essays;" in 1879, "Darwinism and Other Essays;" in 1884, "Excursions of an Evolutionist and the Destiny of Man viewed in the Light of his Origin;" and in 1885, "The Idea of God as affected by Modern Knowledge."

It will be noticed that during his career as an Instructor at Harvard his time was divided between philosophy and history. It is generally understood that a professorship there would have been grateful to him. In that event, if he had found a place in the philosophical department, we should probably never have had from his pen his contributions to American History. Two reasons have been assigned for his failure to secure this appointment, — each of which may have had weight. One was the attack upon Harvard by the religious press after the publication of his *Cosmic Philosophy*, and the other was his iconoclasm. Harvard had its idols. Of these Agassiz was one, and him the aggressive young evolutionist did not spare.

His position as Assistant Librarian was not worthy of him, nor was the work congenial. He therefore resigned from the library corps. He had previously, as we have seen, cut adrift from the law. In which of the two fields of literary labor, philosophy or history, for which he was specially fitted, was there the best chance for a young man with the growing responsibilities of a family on his hands to find the means of support? Such, to a person glancing at his career, would seem to have been the problem which was submitted to him when he severed his connection with Harvard. Yet, if we may accept his own statement, the wonderful amount of learning displayed in the pages of his *Cosmic Philosophy* was simply acquired as a formative process by way of preparation for his future historical work. "The absorbing and overmastering passion for the study of history," he says, "first led me to study evolution in order to obtain a correct method."

Professor Royce, whose analysis of Fiske's contributions to philosophical and religious discussions is very thorough and far reaching, gives him credit for being entirely in earnest in making this statement. "Any critic," he says, "who lacks his [Fiske's] range of reading must be easily tempted to regard his literary activities as too miscellaneous,

and so must in some measure fail to understand in what degree he had his vast resources of imagination under control. Any judge whose human sympathies are narrower than his must find it a baffling task to look for the unity of interest, of opinion, and of ideal which in his mind bound together the many undertakings that marked his career, and the various stages of development through which his thought passed." The critic who had Fiske's range of reading is probably not to be found among us, but if we accept the proposition that he had historical work in view during all the time of this preliminary study in so many fields, still we can safely state that the precise form in which he proposed to put forth his labor was not determined until after he met John Richard Green in London, and talked with him about the "Short History of the English People" which Green was then planning. "I heard him," says Fiske, "telling about his scheme, and I thought it would be a very nice thing to do something of the same sort for American history."

This meeting with Green could not have taken place until 1879. It is plain, therefore, that if he relied upon his own capacity to support his family when he left the Harvard Library, it must have been through literary labor. He had been invited in 1878, while still connected with the Library, to deliver six lectures in the Old South Meeting House Course. This service was performed in 1879, and in June of the same year he was invited by Huxley to lecture before the University College in London. The acceptance of this invitation was fraught with great results. His lectures before the Harvard students were characterized by President Eliot: the first set, as "interesting and inspiring;" the later lectures, as "graphic and stimulating." The Old South lectures demonstrated his power with the public. The London lectures, before a radically different audience, corroborated this conclusion, and his visit brought him in friendly contact with the great body of distinguished men in England who were then busy investigating Darwin's "Theory of Development" and Spencer's "Doctrine of Evolution." Here, too, he met Green and had his mind turned definitely towards specific work in the field of American history. Circumstances thus determined that it was to be through lectures and writing American history that he was to earn his living, a determination which necessarily involved serious limitations as to the time which he could devote to research and which materially influenced the quality of his work.

His success as a lecturer in London led to his being called there again in 1880, when he delivered his three lectures on "American Political Ideas" at the Royal Institute. These he repeated at the Philosophical

Institute of Edinburgh and again in London. He was, indeed, invited to deliver them at the Sorbonne, but the invitation came too late.

His historical publications appeared in the following chronological order. The first was "American Political Ideas," in 1865; he was one of the editors of "Appleton's Cyclopædia of American Biography, 1887-1889" (his selection being in part due, undoubtedly, to his reputation as an historical student); "The Critical Period of American History," in 1888; "Washington and His Country," a book for the young, in 1889; "The War of Independence," a book of the same character, in 1889; "Beginnings of New England," in 1889; "Civil Government in the United States," a school book, in 1890; "American Revolution," in two volumes, in 1891; "Discovery of America," also in two volumes, in 1892; "History of the United States," for schools, 1894; "Old Virginia and Her Neighbors," in two volumes, in 1897; "Dutch and Quaker Colonies in America," in two volumes, in 1899.

Throwing out school books and volumes for the young, we have in the above series ten volumes, written as monographs, and published entirely without regard to their chronological succession, yet each intended as a contribution towards a complete history. Concerning this method of treatment he himself said: "I found myself dwelling upon special points, and insensibly without any volition on my part, it [the history] has been rather taking the shape of separate monographs. But I hope to go on that way until I cover the ground with these separate books." It is not unlikely that Parkman's example may have influenced him in this respect. His enthusiastic admiration for that great and popular writer of history shines forth from every page of the charming essay which he wrote on Parkman's life and works. The condensed form of "Beginnings of New England," containing as it does only the essentials for the development of the theme, suggests the process of digestion and careful elimination which characterizes Parkman's works. Besides the ten historical volumes mentioned, Fiske also published in 1900 a monograph on the "Mississippi Valley in the Civil War," and it is stated that a "History of the United States" will be issued in three volumes posthumously.

Mr. Fiske's works naturally divide themselves into two classes, and these divisions are practically chronological, thus representing the subjects to which his mind turned at different periods of his life. The brief period between the two, when he first took up lecturing and for a few years published only essays and magazine articles, indicates, in all probability, merely a time of study and preparation for future work.

Mr. Scudder says that the impulse toward American history was given by the preparation for the first course of Old South lectures, which were concerned especially with the Colonial period. When Fiske settled down deliberately to his life-work, he found that he could make the lectures subservient to his publications. He describes his method of doing this as follows: "I look it up or investigate it and then write an essay or lecture on the subject. That serves as a preliminary statement either of a large subject or of special points. It is a help to me to try to state the case. I never publish anything after this first statement, but generally keep it with me for, it may be, some years, and possibly return to it several times." While the general proposition is undoubtedly true that the preparation of historical work in tentative form, and the frequent recurrence to it under the stimulus of new studies and varying conditions of mind are of great assistance to the historian, still it must have been true that the great draft upon Mr. Fiske's time and strength occasioned by his lecture tours seriously affected the character of his work. "Fiske's lectures were a drag upon him," says Professor Hart, "because they were so good. Even big men have a limited stock of vitality, and he put into his lectures a power which ought to have gone into investigation. For years together, he appeared as a lecturer, more than a hundred times annually, besides numerous lectures abroad. So far as this work was a needed support for a man with a rising family, it was simply a misfortune; so far as it took the place of equally well paid literary work it was a mistake."

If we turn to the prefaces of his several publications we can there see how much of his time was occupied with these lectures, and we can also learn from the same source how familiar his form must have become to the lecture-going people of the entire country. Yet while his time was thus occupied, the old topics with which his name was associated earlier in life asserted their control over him, and found vent in essays or addresses upon occasions. In 1900 he published a volume entitled "A Century of Science;" following this came "Through Nature to God." The last address which he delivered, "Life Everlasting," was issued by his publishers after his death. This was made possible because Fiske rarely changed a word after he had once put his thoughts on paper.

His great fondness for music was not only evident to those who knew him well, but crops out in his books. He enjoyed the skilful performance of a symphony by an orchestra, and was also capable of interpreting it. To him there was not only harmony and rhythm and melody and the perfection of mechanical execution in the rendering of the music,

but there was some underlying sentiment expressed by the composer which was conveyed to his mind. "When I look upon Parkman's noble life," he says, "I think of Mendelssohn's Chorus, 'He that shall endure to the end,' with its chaste and severely beautiful melody, and the calm, invincible faith which it expresses." Were it not that one cannot conceive how he found time to do it, it would occasion no surprise to learn that he composed a mass as well as several songs.

Mr. Fiske was a large man, and at the time of his death he was very corpulent. He enjoyed good health, borrowed no troubles, and was the type of a vigorous, happy human being, full of affection for his family and of good-will towards his fellow-men. He was absolutely independent and unconventional in his habits, both mentally and physically. The humorous description which he gave of his mode of life thoroughly illustrates this. "I always sit in a draught when I find one," he said, "wear the thinnest clothes I can find, winter and summer; catch cold once in three or four years, but not severely; and prefer to work in a cold room 55 to 60 degrees. Work the larger part of each twenty-four hours, and by day or night indifferently. Scarcely ever change a word once written; eat when hungry; rarely taste coffee or wine or smoke a cigar, but drink two or three quarts of beer a day and smoke a pipe all the time when at work; never experienced the feeling of disinclination for work and therefore never had to force work." The indifference which he expresses to night or day he brings forth in his essay on Chauncey Wright. "At two o'clock in the morning," he says, "he [Wright] would perhaps take his hat and saunter homeward with me by way of finishing the subject; but on reaching my gate a new suggestion would turn us back, — and so we would alternately escort each other home, perhaps a dozen times, until tired Nature asserted her rights, and the newly opened vistas of discussion were regretfully left unexplored." This quotation from Fiske's own works brings him before us as a willing disputant. It must, however, be taken with a grain of salt. If he discussed questions orally with persons from whom he differed in opinion, he selected his opponent. He could not under ordinary circumstances be dragged into an oral discussion.

As a lecturer, his manner of delivery was described as "simple, direct, sincere, and in a way appealing. He talked to his audience in a manner to make them feel that he was talking with them. He had a certain eloquence, which was engaging rather than stirring."

His reviewers concur in saying that his Cosmic Philosophy was

more than a mere exposition of Spencer's doctrine. Fiske not only made clear that which was confused, but he added new propositions. Among these was his chapter on the prolongation of human infancy, a doctrine of great significance and a contribution of importance to the general argument. Its value was recognized by his fellow evolutionists, and he himself repeatedly referred to it in his works, claiming with evident pride it was his and his alone. Most of his biographers find in his later works devoted to religious topics a softened tone which they attribute to a change of views. He himself maintained that he was consistent. Perhaps he was affected and made less aggressive by the change of opinion then going on. There can be no doubt that the public of to-day can read the vigorous attacks of the young evolutionist upon traditional faiths and ingrained prejudices with less feeling than was provoked by them when they were first delivered. On the other hand Fiske may have been unconsciously borne upon the wave of scholarship whose "philosophical, idealistic trend," according to Professor Munsterberg, is "only swelling to-day, but whose highest point may be ten or twenty years hence." At any rate such a sentence as this — "I believe in the immortality of the soul, not in the sense in which I accept the demonstrable proofs of science, but as a supreme act of faith in the reasonableness of God's work" — could not have found place in the pages of *Cosmic Philosophy*. Fiske may not have changed his doctrines, but he certainly modified his manner of expressing them. He combined, according to Professor Royce, "the child's love of the unseen and mysterious with the modern sceptical student's scorn for superstition." These characteristics pervade both his early and late works.

Fiske quotes from Humboldt, "*Nous avons considéré le style comme expression de caractère, comme reflet de l'intérieur de l'homme.*" There can be no doubt that Fiske's publications reveal the personality of the author to the reader. We can easily see, through the lines, the image of the good-natured, straightforward, genial man, whose intellectual honesty leads him to say what he thinks, and whose sense of humor impels him to enliven with a jest even those pages which are devoted to the most abstruse subjects. The weary student of philosophy experiences relaxation from the strain upon his attention consequent upon his effort to follow the argument, when he is told that "the waves of motor energy which the human organism absorbs in whiffs of tobacco smoke are but a series of pulsations of transformed sunlight." The reader, perplexed by the abstruse speculations quoted from some learned philosopher, finds relief in the assertion that the troublesome

paragraph is regarded by Mr. Fiske as "sheer nonsense," or that the whole of a certain system of philosophy is "made up of tawdry rhetoric, quite innocent of observation or induction." It is a satisfaction to learn that an objectionable Spaniard is a "green-eyed, pitiless, perfidious, old wretch." It is refreshing to have such positive opinions occasionally expressed concerning books, as the following: "For perverse ingenuity in creating difficulties where none exist, this book is a curiosity in the literature of psychology. From long staring at mare's nests the author had acquired a chronic twist in his vision." The most ardent protectionist could not fail to be amused at the vigorous attacks on his favorite doctrine with which the several volumes on American History are interspersed. Lovers of "Alice in Wonderland" will recognize upon the pages of Fiske's books their old acquaintance, the Jabberwok, and readers of the "Arabian Nights Entertainment" will find that several familiar genii do service by way of illustration or to make some point. Characters from Cervantes, Scott, Lowell, Dickens, and Charles Reade intrude themselves upon the reader, generally with the claim that they already know him and therefore the form of an introduction may be dispensed with. One thing is noticeable, and that is the absence of quotations from our favorite poets. "Hudibras" and "The Biglow Papers" attract him; the quaint attempts at verse of some of our early American writers evidently amuse him; but poetry as such does not appeal to him. On the other hand humor always does, and we find him gravely quoting Diedrich Knickerbocker, with the warning of course that he is dealing with fiction, but nevertheless accepting Irving's burlesque descriptions as representative of his conception of the persons therein characterized. The mention of large oysters in Virginia recalls to Fiske an anecdote of Thackeray, with which his reader is assumed to be familiar. "We remember Thackeray," he says, "when we encounter oysters so large that Basil Ringrose has to cut them into quarters." The detection of an error on the part of a famous writer leads to the following foot-note: "Aliquando dormitat bonus Homerus." No reader of the *Discovery of America* but will understand this. By such means, Fiske lures the reader on, and entices him over passages in his books which might otherwise prove dull. His simple, direct, and lucid style; his obvious purpose to deal honestly with facts; his pronounced opinions upon points not free from doubt in the minds of many students; his discrimination in sifting out the events which are significant; his sagacity in measuring the proportion of their relative importance; even his open advocacy of those whose career appealed to him no matter what

the opinion of others, all combined to secure the approval of a large reading public, and thus earned for him the honorable title which has been conferred upon him since his death, "Popularizer of useful knowledge." — In its restricted application to the field of history, this epithet was adopted by Colonel Higginson in some remarks before the Massachusetts Historical Society in February, and was repeated by him with emphatic recognition of the honor thereby intended to be conferred, at the March meeting of the Academy.

Fiske's whole life was, in the words of Mead, "a noble illustration of resolute intellectual integrity." "Only another John Fiske," says Professor Royce, "if such a being were possible — a man as widely read as he was, and with a soul as sweetly humane in sentiment, as clear in vision, as free from pettiness, as childlike in faith in what it had once accepted, and yet as keen in critical intelligence regarding what it rejected as was his soul — only such a man could estimate adequately Fiske's beneficent life-work and his manifold mental accomplishments."

In conclusion let me say, that in accepting the appointment to write Mr. Fiske's memoir, I did so with the full consciousness of my unfitness for the task, if knowledge of the subjects discussed in what the London "Times" terms the bewildering variety of his publications, were to be made the basis of one's qualifications. To find a memorialist up to this standard might be difficult even in the Academy. It seemed to me, therefore, that all that could be expected of any person would be to throw upon the screen a composite picture, made up from contributions by Fiske himself and by the various writers who have furnished biographies of his life and criticisms of his works. This is what I have striven to do.

ANDREW MCFARLAND DAVIS.

JAMES BRADLEY THAYER.

A MASSACHUSETTS man by ancestry, birth, and training, James Bradley Thayer, our late vice-president, represented by the simplicity of his life, his scholarly tastes and achievements, his practical good sense, his public spirit, and generous sympathies, the highest type of the New Englander. He was born January 15, 1831, in Haverhill, where his father exercised a wide and wholesome influence as a journalist. He entered Harvard College at the age of seventeen, having fitted himself for the examinations after his fourteenth year, like his brother before him, without the aid of a teacher. He ranked high in his class and was the class orator. After an interval spent in teaching he entered the Harvard Law School in 1854. Here he gave proof of his literary and legal ability by winning, in his second year, the class prize for an essay on the "Law of Eminent Domain." It is interesting to note that his first legal essay, which was printed at once in the leading law periodical of the day, was upon a topic in Constitutional Law, one of the two branches of law in which he afterward acquired his great distinction.

An incident in his career at the Law School exhibited the character of the man. The Harvard Corporation had appointed Judge E. G. Loring to a professorship in the Law School. But the Board of Overseers, on account of the Judge's decision, sending back to slavery the fugitive slave Anthony Burns, refused to confirm this appointment. The Southerners and their sympathizers in the Law School moved in their parliament a vote of censure upon the Overseers. The motion was opposed on various parliamentary grounds, but finally the majority determined to put the vote through in disregard of orderly procedure, and the Clerk was directed to call the roll of yeas and nays. Mr. Thayer, who was Clerk, rose, and in a quiet but impressive manner declined to be a party to this unparliamentary action, resigned his office, and walked away from his desk. The motion was ultimately carried, but Mr. Thayer's calm, dignified rebuke of their proceedings robbed the victory of well-nigh all its glory even in the minds of the victors.

For nearly twenty years Mr. Thayer was active in the practice of his profession, residing during the greater part of this time in Milton, where he was conspicuous for his public-spirited interest in all that affected the welfare of the town.

In 1874 he was appointed a professor in the Harvard Law School. He had previously declined the offer of a professorship in the English Department of the College. Although his rare gift for thoughtful, graceful, and effective writing could not have failed to make him highly successful as a professor of English, his decision not to give up his chosen profession was doubtless a wise one. Certainly it was a fortunate one for the Law School and the law.

Wherever the Harvard Law School is known, he has been recognized for many years as one of its chief ornaments. When, in 1900, the Association of American Law Schools was formed, it was taken for granted by all the delegates that Professor Thayer was to be its first President. No one can measure his great influence upon the thousands of his pupils. While at the School they had a profound respect for his character and ability, and they realized that they were sitting at the feet of a master of his subjects. In their after life his precept and example have been, and will continue to be, a constant stimulus to genuine, thorough and finished work, and a constant safeguard against hasty generalization or dogmatic assertion. His quick sympathy, his unflinching readiness to assist the learner, out of the class-room as well as in it, and his attractive personality, gave him an exceptionally strong hold upon the affections of the young men. Their attitude towards him is well expressed in a letter from a recent graduate of the School, who describes him as "one of the best known, best liked, and strongest of the Law Professors."

During the early years of his service he lectured on a variety of legal topics, but Evidence and Constitutional Law were especially congenial to him, and in the end he devoted himself exclusively to these two subjects, in each of which he had prepared for the use of his classes an excellent collection of cases. Evidence was an admirable field for his powers of historical research and analytical judgment. He recognized that our artificial rules of evidence were the natural outgrowth of trial by jury, and could only be explained by tracing carefully the development of that institution in England. The results of his work appeared in his "Preliminary Treatise on the Law of Evidence," a worthy companion of the masterly "Origin of the Jury," by the distinguished German, Professor Brunner. His book gave him an immediate reputation, not only in this country, but in England, as a legal historian and jurist of the first rank. An eminent English lawyer, in reviewing it, described it as "a book which goes to the root of the subject more thoroughly than any other text-book in existence."

Although he published no treatise upon Constitutional Law, he achieved, by his essays, by his collection of Cases, and by his teaching, a reputation in that subject hardly second to his rank in Evidence. To the few who knew of it, President McKinley's wish to make Professor Thayer a member of the present Philippines Commission seemed a natural and most fitting recognition of his eminence as a constitutional lawyer, and if he had deemed it wise to accept the position offered to him, no one can doubt that the appointment would have commanded universal approval.

It is greatly to be deplored that he was not permitted to give to the world the additional contributions to legal literature, which the vigor of his powers and his known purposes led us to expect from him. That he did not realize these purposes earlier was due to his very virtues. His wide range of interests, his constant service in helping other writers in their work, and above all his passion for perfection in his own work, explain why the message he might have given remains incomplete. The pathetic interest of high hopes unfulfilled attaches to a memorandum found among his papers, and written last September.

"Sept. 15

For next year.

Have a single plan to put through. Without that the small everyday matters eat up all the time. They easily may, for they can be done either well enough or *perfectly*.

That plan must be the 2nd volume of Evidence.

For the year following, a small Vol. on Const. Law.

For the time following that, the works, writings and life of Marshall —
and then an End."

The relations of the law professors are probably closer than those of any other department of the University. No one who has not known, as his colleagues have known, the charm of his daily presence and conversation, and the delightful quality of his vacation letters, can appreciate the deep and abiding sense of the irreparable loss they have suffered in the death of Professor Thayer.

In our great grief we find our chief comfort in the thought of his simple and beautiful life, greatly blessed in his home and family, rich in choice friendships, crowned with the distinction that comes only to the possessor of great natural gifts nobly used, full of happiness to himself, and giving in abundant measure happiness and inspiration to others.

JAMES BARR AMES.

There have been no resignations during the year. One Resident Fellow, formerly an Associate, having again made his residence outside of Massachusetts, has been restored to Associate Fellowship.

New members elected are: Resident Fellows, 9; Associate Fellows, 3; Foreign Honorary Members, 5.

The roll of the Academy therefore now includes 200 Resident Fellows, 100 Associate Fellows, and 71 Foreign Honorary Members.*

* By the death of a Resident Fellow, and by the election of new members at the annual meeting of May 14, 1902, the roll stands at date of publication 199 Resident Fellows, 100 Associate Fellows, and 73 Foreign Honorary Members.

American Academy of Arts and Sciences.

OFFICERS AND COMMITTEES FOR 1902-03.

PRESIDENT.

ALEXANDER AGASSIZ.

VICE-PRESIDENT.

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JOHN TROWBRIDGE,

Class II.
HENRY P. WALCOTT,

Class III.
JOHN C. GRAY.

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WILLIAM M. DAVIS.

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WILLIAM WATSON.

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THEOBALD SMITH,
Terms expire 1903.

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ROBERT DE C. WARD,
Terms expire 1904.

DENMAN W. ROSS,

ARTHUR G. WEBSTER,

EDWARD L. MARK,
Terms expire 1905.

ARLO BATES,

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CRAWFORD H. TOY, of Class III.

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HENRY W. HAYNES, of Class III.

AUDITING COMMITTEE.

HENRY G. DENNY,

WILLIAM L. RICHARDSON.

LIST

OF THE

FELLOWS AND FOREIGN HONORARY MEMBERS.

(Corrected to May 14, 1902.)

RESIDENT FELLOWS.—199.

(Number limited to two hundred.)

CLASS I.—*Mathematical and Physical Sciences.*—82.

SECTION I.—20.

Mathematics and Astronomy.

Solon I. Bailey,	Cambridge.
Maxime Bôcher,	Cambridge.
William E. Byerly,	Cambridge.
Seth C. Chandler,	Cambridge.
Gustavus Hay,	Boston.
Percival Lowell,	Boston.
Henry Mitchell,	Nantucket.
William F. Osgood,	Cambridge.
James Mills Peirce,	Cambridge.
Edward C. Pickering,	Cambridge.
William H. Pickering,	Cambridge.
Henry S. Pritchett,	Boston.
John Ritchie, Jr.,	Roxbury.
John D. Runkle,	Cambridge.
Edwin F. Sawyer,	Brighton.
Arthur Searle,	Cambridge.
William E. Story,	Worcester.
Henry Taber,	Worcester.
O. C. Wendell,	Cambridge.
P. S. Yendell,	Dorchester.

SECTION II.—23.

Physics.

A. Graham Bell,	Washington, D.C.
Clarence J. Blake,	Boston.
Francis Blake,	Weston.
Harry E. Clifford,	Newton.
Charles R. Cross,	Brookline.
Amos E. Dolbear,	Somerville.
A. W. Duff,	Worcester.
H. M. Goodwin,	Roxbury.
Edwin H. Hall,	Cambridge.
Hammond V. Hayes,	Cambridge.
William L. Hooper,	Somerville.
William W. Jacques,	Newton.
Frank A. Laws,	Boston.
Henry Lefavour,	Williamstown.
Theodore Lyman,	Brookline.
Benjamin O. Peirce,	Cambridge.
A. Lawrence Rotch,	Boston.
Wallace C. Sabine,	Boston.
John S. Stone,	Boston.
Elihu Thomson,	Swampscott.

John Trowbridge, Cambridge.
A. G. Webster, Worcester.
Robert W. Willson, Cambridge.

SECTION III. — 22.

Chemistry.

Samuel Cabot, Boston.
Arthur M. Comey, Cambridge.
James M. Crafts, Boston.
Charles W. Eliot, Cambridge.
Henry B. Hill, Cambridge.
Charles L. Jackson, Cambridge.
Walter L. Jennings, Worcester.
Leonard P. Kinnicutt, Worcester.
Charles F. Mabery, Cleveland, O.
Arthur Michael, Boston.
George D. Moore, Worcester.
Charles E. Munroe, Wash'gton, D.C.
John U. Nef, Chicago, Ill.
Arthur A. Noyes, Boston.
Robert H. Richards, Jamaica Plain.
Theodore W. Richards, Cambridge.
Charles R. Sanger, Cambridge.
Stephen P. Sharples, Cambridge.

Francis H. Storer, Boston.
Henry P. Talbot, Newton.
Charles H. Wing, Ledger, N. C.
Edward S. Wood, Boston.

SECTION IV. — 17.

Technology and Engineering.

Eliot C. Clarke, Boston.
Heinrich O. Hofman, Jamaica Plain.
Ira N. Hollis, Cambridge.
L. J. Johnson, Cambridge.
Gaetano Lanza, Boston.
E. D. Leavitt, Cambridge.
William R. Livermore, Boston.
Hiram F. Mills, Lowell.
Cecil H. Peabody, Brookline.
Alfred P. Rockwell, Manchester.
Andrew H. Russell, Manilla.
Peter Schwamb, Arlington.
H. L. Smyth, Cambridge.
Charles S. Storrow, Boston.
George F. Swain, Boston.
William Watson, Boston.
Morrill Wyman, Cambridge.

CLASS II. — *Natural and Physiological Sciences.* — 66

SECTION I. — 14.

Geology, Mineralogy, and Physics of the Globe.

H. H. Clayton, Milton.
Algernon Coolidge, Boston.
William O. Crosby, Jamaica Plain.
William M. Davis, Cambridge.
Benj. K. Emerson, Amherst.
O. W. Huntington, Newport, R. I.
Robert T. Jackson, Cambridge.
T. A. Jaggar, Jr., Cambridge.
William H. Niles, Cambridge.
John E. Pillsbury, Boston.
Nathaniel S. Shaler, Cambridge.
Robert DeC. Ward, Cambridge.
John E. Wolff, Cambridge.
J. B. Woodworth, Cambridge.

SECTION II. — 11.

Botany.

F. S. Collins, Malden.
Geo. E. Davenport, Medford.
William G. Farlow, Cambridge.
Charles E. Faxon, Jamaica Plain.
Merritt L. Fernald, Cambridge.
George L. Goodale, Cambridge.
John G. Jack, Jamaica Plain.
B. L. Robinson, Cambridge.
Charles S. Sargent, Brookline.
Arthur B. Seymour, Cambridge.
Roland Thaxter, Cambridge.

SECTION III. — 25.

Zoölogy and Physiology.

Alexander Agassiz, Cambridge.
Robert Amory, Boston.

James M. Barnard, Milton.
 Henry P. Bowditch, Jamaica Plain.
 William Brewster, Cambridge.
 Louis Cabot, Brookline.
 William E. Castle, Cambridge.
 Samuel F. Clarke, Williamstown.
 W. T. Councilman, Boston.
 Charles B. Davenport, Chicago, Ill.
 Harold C. Ernst, Jamaica Plain.
 Edward G. Gardiner, Boston.
 Samuel Henshaw, Cambridge.
 Theodore Hough, Boston.
 John S. Kingsley, Somerville.
 Edward L. Mark, Cambridge.
 Charles S. Minot, Milton.
 Edward S. Morse, Salem.
 George H. Parker, Cambridge.
 William T. Porter, Boston.
 James J. Putnam, Boston.
 Samuel H. Scudder, Cambridge.
 William T. Sedgwick, Boston.

James C. White, Boston.
 William M. Woodworth, Cambridge.

SECTION IV. — 16.

Medicine and Surgery.

Samuel L. Abbot, Boston.
 Edward H. Bradford, Boston.
 Arthur T. Cabot, Boston.
 David W. Cheever, Boston.
 Frank W. Draper, Boston.
 Thomas Dwight, Boston.
 Reginald H. Fitz, Boston.
 Charles F. Folsom, Boston.
 Frederick I. Knight, Boston.
 Samuel J. Mixter, Boston.
 W. L. Richardson, Boston.
 Theobald Smith, Jamaica Plain.
 O. F. Wadsworth, Boston.
 Henry P. Walcott, Cambridge.
 John C. Warren, Boston.
 Francis H. Williams, Boston.

CLASS III. — *Moral and Political Sciences.* — 51.

SECTION I. — 9.

Philosophy and Jurisprudence.

James B. Ames, Cambridge.
 Horace Gray, Boston.
 John C. Gray, Boston.
 G. Stanley Hall, Worcester.
 Geo. F. Hoar, Worcester.
 Francis C. Lowell, Boston.
 Josiah Royce, Cambridge.
 Jeremiah Smith, Cambridge.
 Edward H. Strobel, Cambridge.

SECTION II. — 21.

Philology and Archæology.

William S. Appleton, Boston.
 Charles P. Bowditch, Jamaica Plain.
 Lucien Carr, Cambridge.
 Franklin Carter, Williamstown.
 Joseph T. Clarke, Boston.
 Henry G. Denny, Roxbury.
 William Everett, Quincy.

J. W. Fewkes, Washington, D.C.
 William W. Goodwin, Cambridge.
 Henry W. Haynes, Boston.
 Charles R. Lanman, Cambridge.
 David G. Lyon, Cambridge.
 Morris H. Morgan, Cambridge.
 Bennett H. Nash, Boston.
 Frederick W. Putnam, Cambridge.
 Edward Robinson, Boston.
 F. B. Stephenson, Boston.
 Crawford H. Toy, Cambridge.
 John W. White, Cambridge.
 John H. Wright, Cambridge.
 Edward J. Young, Waltham.

SECTION III. — 10.

Political Economy and History.

Charles F. Adams, Lincoln.
 Edward Atkinson, Brookline.
 Andrew McF. Davis, Cambridge.
 Ephraim Emerton, Cambridge.

A. C. Goodell,	Salem.	John Bartlett,	Cambridge.
Henry C. Lodge,	Nahant.	Arlo Bates,	Boston.
A. Lawrence Lowell,	Boston.	George S. Boutwell,	Groton.
James F. Rhodes,	Boston.	J. Elliot Cabot,	Brookline.
Charles C. Smith,	Boston.	T. W. Higginson,	Cambridge.
F. W. Taussig,	Cambridge.	George L. Kittredge,	Cambridge.

SECTION IV. — 11.

Literature and the Fine Arts.

Francis Bartlett,	Boston.	Charles G. Loring,	Boston.
		Charles Eliot Norton,	Cambridge.
		Denman W. Ross,	Cambridge.
		Barrett Wendell,	Boston.

ASSOCIATE FELLOWS. — 100.

(Number limited to one hundred. Elected as vacancies occur.)

CLASS I. — *Mathematical and Physical Sciences.* — 38.

SECTION I. — 14.

Mathematics and Astronomy.

Edward E. Barnard, Williams Bay,
S. W. Burnham, Chicago. [Wis.
George Davidson, San Francisco.
Fabian Franklin, Baltimore.
Asaph Hall, Goshen, Conn.
George W. Hill, W. Nyack, N.Y.
E. S. Holden, New York.
Emory McClintock, Morristown, N.J.
E. H. Moore, Chicago.
Simon Newcomb, Washington.
Charles L. Poor, New York.
George M. Searle, Washington.
J. N. Stockwell, Cleveland, O.
Chas. A. Young, Princeton, N. J.

SECTION II. — 8.

Physics.

Carl Barus, Providence, R.I.
J. Willard Gibbs, New Haven.
G. E. Hale, Williams Bay, Wis.
S. P. Langley, Washington.
T. C. Mendenhall,

A. A. Michelson, Chicago.
Ogden N. Rood, New York.
E. L. Nichols, Ithaca, N. Y.

SECTION III. — 8.

Chemistry.

T. M. Drown, So. Bethlehem, Pa.
Wolcott Gibbs, Newport, R.I.
Frank A. Gooch, New Haven.
S. W. Johnson, New Haven.
J. W. Mallet, Charlottesville, Va.
E. W. Morley, Cleveland, O.
J. M. Ordway, New Orleans.
Ira Remsen, Baltimore.

SECTION IV. — 8.

Technology and Engineering.

Henry L. Abbot, Cambridge.
Cyrus B. Comstock, New York. [Va.
W. P. Craighill, Charlestown, W.
John Fritz, Bethlehem, Pa.
F. R. Hutton, New York.
George S. Morison, New York.
William Sellers, Edge Moor, Del.
Robt. S. Woodward, New York.

CLASS II. — *Natural and Physiological Sciences.* — 33.

SECTION I. — 12.

Geology, Mineralogy, and Physics of the Globe.

Cleveland Abbe, Washington.
George J. Brush, New Haven.
T. C. Chamberlin, Chicago.
Edward S. Dana, New Haven.

Walter G. Davis, Cordova, Arg.
G. K. Gilbert, Washington.
J. Peter Lesley, Milton, Mass.
S. L. Penfield, New Haven.
J. W. Powell, Washington.
R. Pumpelly, Newport, R.I.
A. R. C. Selwyn, Vancouver.
Charles D. Walcott, Washington.

SECTION II. — 6.

Botany.

L. H. Bailey,	Ithaca, N. Y.
D. H. Campbell,	Palo Alto, Cal.
J. M. Coulter,	Chicago.
C. G. Pringle,	Charlotte, Vt.
John D. Smith,	Baltimore.
W. Trelease,	St. Louis.

SECTION III. — 9.

Zoölogy and Physiology.

Joel A. Allen,	New York.
W. K. Brooks,	Lake Roland, Md.
F. P. Mall,	Baltimore.

S. Weir Mitchell,	Philadelphia.
H. F. Osborn,	New York.
A. S. Packard,	Providence, R.I.
A. E. Verrill,	New Haven.
C. O. Whitman,	Chicago.
E. B. Wilson,	New York.

SECTION IV. — 6.

Medicine and Surgery.

John S. Billings,	New York.
W. S. Halsted,	Baltimore.
W. W. Keen,	Philadelphia.
William Osler,	Baltimore.
Wm. H. Welch,	Baltimore.
H. C. Wood,	Philadelphia.

CLASS III. — *Moral and Political Sciences.* — 29.

SECTION I. — 7.

Philosophy and Jurisprudence.

James C. Carter,	New York.
Joseph H. Choate,	New York.
Melville W. Fuller,	Washington.
William W. Howe,	New Orleans.
Charles S. Peirce,	Milford, Pa.
G. W. Pepper,	Philadelphia.
T. R. Pynchon,	Hartford, Conn.

SECTION II. — 7.

Philology and Archæology.

Timothy Dwight,	New Haven.
B. L. Gildersleeve,	Baltimore.
D. C. Gilman,	Baltimore.
T. R. Lounsbury,	New Haven.
Rufus B. Richardson,	Athens.
Thomas D. Seymour,	New Haven.
A. D. White,	Ithaca, N. Y.

SECTION III. — 6.

Political Economy and History.

Henry Adams,	Washington.
G. P. Fisher,	New Haven.
H. E. von Holst,	Chicago.
Henry C. Lea,	Philadelphia.
H. Morse Stephens,	Ithaca.
W. G. Sumner,	New Haven.

SECTION IV. — 9.

Literature and the Fine Arts.

James B. Angell,	Ann Arbor, Mich.
L. P. di Cesnola,	New York.
H. H. Furness,	Wallingford, Pa.
R. S. Greenough,	Florence.
Herbert Putnam,	Washington.
Augustus St. Gaudens,	Windsor, Vt.
John S. Sargent,	London.
E. C. Stedman,	Bronxville, N. Y.
W. R. Ware,	New York.

FOREIGN HONORARY MEMBERS.—73.

(Number limited to seventy-five. Elected as vacancies occur.)

CLASS I.—*Mathematical and Physical Sciences.*—23.

SECTION I.—7.

Mathematics and Astronomy.

Arthur Auwers,	Berlin.
George H. Darwin,	Cambridge.
H. A. E. A. Faye,	Paris.
Sir William Huggins,	London.
H. Poincaré,	Paris.
Otto Struve,	Karlsruhe.
H. C. Vogel,	Potsdam.

SECTION II.—5.

Physics.

Ludwig Boltzmann,	Vienna.
Oliver Heaviside,	Newton Abbot.
F. Kohlrausch,	Berlin.
Lord Rayleigh,	Witham.
Sir G. G. Stokes, Bart.,	Cambridge.

SECTION III.—6.

Chemistry.

Adolf Baeyer,	Munich.
Marcellin Berthelot,	Paris.
J. H. van't Hoff,	Berlin.
D. Mendeleeff,	St. Petersburg.
Sir H. E. Roscoe,	London.
Julius Thomsen,	Copenhagen.

SECTION IV.—5.

Technology and Engineering.

Sir Benjamin Baker,	London.
Lord Kelvin,	Largs.
Maurice Lévy,	Paris.
H. Müller-Breslau,	Berlin.
W. Cawthorne Unwin,	London.

CLASS II.—*Natural and Physiological Sciences.*—27.

SECTION I.—7.

Geology, Mineralogy, and Physics of the Globe.

Sir Archibald Geikie,	London.
Julius Hann,	Vienna.
Albert Heim,	Zurich.
Sir John Murray,	Edinburgh.
Freih. v. Richthofen,	Berlin.
Henry C. Sorby,	Sheffield.
Heinrich Wild,	Zurich.

SECTION II.—6.

Botany.

E. Bornet,	Paris.
A. Engler,	Berlin.
Sir Joseph D. Hooker,	Sunningdale.
W. Pfeffer,	Leipsic.
H. Graf zu Solms- Laubach,	Strassburg.
Eduard Strasburger,	Bonn.

SECTION III.—7.

Zoölogy and Physiology.

Sir Michael Foster,	Cambridge.
Carl Gegenbaur,	Heidelberg.
Ludimar Hermann,	Königsberg.
A. von Kölliker,	Würzburg.
H. Kronecker,	Bern.
E. Ray Lankester,	London.
Elias Metschnikoff,	Paris.

SECTION IV.—7.

Medicine and Surgery.

Sir T. L. Brunton,	London.
A. Celli,	Rome.
V. A. H. Horsley,	London.
R. Koch,	Berlin.
Lord Lister,	London.
F. v. Recklinghausen,	Strassburg.
Rudolf Virchow,	Berlin.

CLASS III.—*Moral and Political Sciences.*—23.

SECTION I.—5.

Philosophy and Jurisprudence.

A. J. Balfour,	Prestonkirk.
Heinrich Brunner,	Berlin.
A. V. Dicey,	Oxford.
F. W. Maitland,	Cambridge.
Sir Frederick Pollock,	Bart.,
	London.

SECTION III.—4.

Political Economy and History.

James Bryce,	London.
Theodor Mommsen,	Berlin.
Sir G. O. Trevelyan,	Bart.,
	London.
W. E. H. Lecky,	London.

SECTION II.—7.

Philology and Archaeology.

Ingram Bywater,	Oxford.
F. Delitzsch,	Berlin.
W. Dörpfeld,	Athens.
Sir John Evans,	Hemel Hempstead.
H. Jackson,	Cambridge.
J. W. A. Kirchhoff,	Berlin.
G. C. C. Maspero,	Paris.

SECTION IV.—7.

Literature and the Fine Arts.

E. de Amicis,	Florence.
Georg Brandes,	Copenhagen.
F. Brunetière,	Paris.
Jean Léon Gérôme,	Paris.
Rudyard Kipling,	Rottingdean.
G. Paris,	Paris.
Leslie Stephen,	London.

STATUTES AND STANDING VOTES.

STATUTES.

Adopted May 30, 1854: amended September 8, 1857, November 12, 1862, May 24, 1864, November 9, 1870, May 27, 1873, January 26, 1876, June 16, 1886, October 8, 1890, January 11 and May 10, 1893, May 9 and October 10, 1894, March 13, April 10 and May 8, 1895, May 8, 1901, and January 8, 1902.

CHAPTER I.

OF FELLOWS AND FOREIGN HONORARY MEMBERS.

1. The Academy consists of Resident Fellows, Associate Fellows and Foreign Honorary Members. They are arranged in three Classes, according to the Arts and Sciences in which they are severally proficient, viz.: Class I. The Mathematical and Physical Sciences;—Class II. The Natural and Physiological Sciences;—Class III. The Moral and Political Sciences. Each Class is divided into four Sections, viz.: Class I., Section 1. Mathematics and Astronomy;—Section 2. Physics;—Section 3. Chemistry;—Section 4. Technology and Engineering. Class II., Section 1. Geology, Mineralogy, and Physics of the Globe;—Section 2. Botany;—Section 3. Zoölogy and Physiology;—Section 4. Medicine and Surgery. Class III., Section 1. Philosophy and Jurisprudence:—Section 2. Philology and Archæology;—Section 3. Political Economy and History;—Section 4. Literature and the Fine Arts.

2. The number of Resident Fellows shall not exceed two hundred. Only residents in the Commonwealth of Massachusetts shall be eligible to election as Resident Fellows, but resident fellowship may be retained after removal from the Commonwealth. Each Resident Fellow shall pay an admission fee of ten dollars and such annual assessment, not exceeding ten dollars, as shall be voted by the Academy at each annual

meeting. Resident Fellows only may vote at the meetings of the Academy.

3. The number of Associate Fellows shall not exceed one hundred, of whom there shall not be more than forty in either of the three classes of the Academy. Associate Fellows shall be chosen from persons residing outside of the Commonwealth of Massachusetts. They shall not be liable to the payment of any fees or annual dues, but on removing within the Commonwealth they may be transferred by the Council to resident fellowship as vacancies there occur.

4. The number of Foreign Honorary Members shall not exceed seventy-five; and they shall be chosen from among persons most eminent in foreign countries for their discoveries and attainments in either of the three departments of knowledge above enumerated. There shall not be more than thirty Foreign Members in either of these departments.

CHAPTER II.

OF OFFICERS.

1. There shall be a President, three Vice-Presidents, one for each Class, a Corresponding Secretary, a Recording Secretary, a Treasurer, and a Librarian, which officers shall be annually elected, by ballot, at the Annual Meeting, on the second Wednesday in May.

2. At the Annual Meeting of 1901, nine Councillors shall be elected by ballot, one from each Class of the Academy to serve for one year, one from each Class for two years, and one from each Class for three years; and at annual meetings thereafter three Councillors shall be elected in the same manner, one from each Class, to serve for three years; but the same Fellow shall not be eligible for two successive terms. The nine Councillors, with the President, the three Vice-Presidents, the two Secretaries, the Treasurer, and the Librarian, shall constitute the Council. Five members shall constitute a quorum. It shall be the duty of this Council to exercise a discreet supervision over all nominations and elections. With the consent of the Fellow interested, they shall have power to make transfers between the several Sections of the same Class, reporting their action to the Academy.

3. If any office shall become vacant during the year, the vacancy shall be filled by a new election, and at the next stated meeting, or at a meeting called for this purpose.

CHAPTER III.

OF NOMINATIONS OF OFFICERS.

1. At the stated meeting in March, the President shall appoint from the next retiring Councillors a Nominating Committee of three Fellows, one for each class.

2. It shall be the duty of this Nominating Committee to prepare a list of candidates for the offices of President, Vice-Presidents, Corresponding Secretary, Recording Secretary, Treasurer, Librarian, Councillors, and the Standing Committees which are chosen by ballot; and to cause this list to be sent by mail to all the Resident Fellows of the Academy not later than four weeks before the Annual Meeting.

3. Independent nominations for any office, signed by at least five Resident Fellows and received by the Recording Secretary not less than ten days before the Annual Meeting, shall be inserted in the call for the Annual Meeting, which shall then be issued not later than one week before that meeting.

4. The Recording Secretary shall prepare for use, in voting at the Annual Meeting, a ballot containing the names of all persons nominated for office under the conditions given above.

5. When an office is to be filled at any other time than at the Annual Meeting, the President shall appoint a Nominating Committee in accordance with the provisions of Section 1, which shall announce its nomination in the manner prescribed in Section 2 at least two weeks before the time of election. Independent nominations, signed by at least five Resident Fellows and received by the Recording Secretary not later than one week before the meeting for election, shall be inserted in the call for that meeting.

CHAPTER IV.

OF THE PRESIDENT.

1. It shall be the duty of the President, and, in his absence, of the senior Vice-President present, or next officer in order as above enumerated, to preside at the meetings of the Academy; to summon extraordinary meetings, upon any urgent occasion; and to execute or see to the execution of the Statutes of the Academy. Length of continuous membership in the Academy shall determine the seniority of the Vice-Presidents.

2. The President, or, in his absence, the next officer as above enumerated, is empowered to draw upon the Treasurer for such sums of money as the Academy shall direct. Bills presented on account of the Library, or the Publications of the Academy, must be previously approved by the respective committees on these departments.

3. The President, or, in his absence, the next officer as above enumerated, shall nominate members to serve on the different committees of the Academy which are not chosen by ballot.

4. Any deed or writing to which the common seal is to be affixed shall be signed and sealed by the President, when thereto authorized by the Academy.

CHAPTER V.

OF STANDING COMMITTEES.

1. At the Annual Meeting there shall be chosen the following Standing Committees, to serve for the year ensuing, viz. : —

2. The Committee of Finance, to consist of the President, Treasurer, and one Fellow chosen by ballot, who shall have full control and management of the funds and trusts of the Academy, with the power of investing or changing the investment of the same at their discretion. The general appropriations for the expenditures of the Academy shall be moved by this Committee at the Annual Meeting, and all special appropriations from the general and publication funds shall be referred to or proposed by this Committee.

3. The Rumford Committee, of seven Fellows, to be chosen by ballot, who shall consider and report on all applications and claims for the Rumford Premium, also on all appropriations from the income of the Rumford Fund, and generally see to the due and proper execution of this trust.

4. The C. M. Warren Committee, of seven Fellows, to be chosen by ballot, who shall consider and report on all applications for appropriations from the income of the C. M. Warren Fund, and generally see to the due and proper execution of this trust.

5. The Committee of Publication, of three. Fellows, one from each Class, to whom all communications submitted to the Academy for publication shall be referred, and to whom the printing of the Memoirs and the Proceedings shall be intrusted.

6. The Committee on the Library, of the Librarian *ex officio* and three other Fellows, one from each class, who shall examine the Library, and make an annual report on its condition and management.

7. An Auditing Committee of two Fellows, for auditing the accounts of the Treasurer.

CHAPTER VI.

OF THE SECRETARIES.

1. The Corresponding Secretary shall conduct the correspondence of the Academy, recording or making an entry of all letters written in its name, and preserving on file all letters which are received; and at each meeting he shall present the letters which have been addressed to the Academy since the last meeting. Under the direction of the Council for Nomination, he shall keep a list of the Resident Fellows, Associate Fellows, and Foreign Honorary Members, arranged in their Classes and in Sections in respect to the special sciences in which they are severally proficient; and he shall act as secretary to the Council.

2. The Recording Secretary shall have charge of the Charter and Statute-book, journals, and all literary papers belonging to the Academy. He shall record the proceedings of the Academy at its meetings; and after each meeting is duly opened, he shall read the record of the preceding meeting. He shall notify the meetings of the Academy, apprise officers and committees of their election or appointment, and inform the Treasurer of appropriations of money voted by the Academy. He shall post up in the Hall a list of the persons nominated for election into the Academy; and when any individual is chosen, he shall insert in the record the names of the Fellows by whom he was nominated.

3. The two Secretaries, with the Chairman of the Committee of Publication, shall have authority to publish such of the records of the meetings of the Academy as may seem to them calculated to promote its interests.

CHAPTER VII.

OF THE TREASURER.

1. The Treasurer shall give such security for the trust reposed in him as the Academy shall require.

2. He shall receive officially all moneys due or payable, and all bequests or donations made to the Academy, and shall pay such sums as the Academy may direct. He shall keep an account of all receipts and expenditures; shall submit his accounts to the Auditing Committee; and shall report the same at the expiration of his term of office.

3. The Treasurer shall keep separate accounts of the income and appropriation of the Rumford Fund and of other special funds, and report the same annually.

4. All moneys which there shall not be present occasion to expend shall be invested by the Treasurer, under the direction of the Finance Committee.

CHAPTER VIII.

OF THE LIBRARIAN AND LIBRARY.

1. It shall be the duty of the Librarian to take charge of the books, to keep a correct catalogue of them, to provide for the delivery of books from the Library, and to appoint such agents for these purposes as he may think necessary. He shall make an annual report on the condition of the Library.

2. The Librarian, in conjunction with the Committee on the Library, shall have authority to expend such sums as may be appropriated, either from the General, Rumford or other special Funds of the Academy, for the purchase of books, and for defraying other necessary expenses connected with the Library.

3. To all books in the Library procured from the income of the Rumford Fund, or other special funds, the Librarian shall cause a stamp or label to be affixed, expressing the fact that they were so procured.

4. Every person who takes a book from the Library shall give a receipt for the same to the Librarian or his assistant.

5. Every book shall be returned in good order, regard being had to the necessary wear of the book with good usage. If any book shall be lost or injured, the person to whom it stands charged shall replace it by a new volume or set; if it belongs to a set, or pay the current price of the volume or set to the Librarian; and thereupon the remainder of the set, if the volume belonged to a set, shall be delivered to the person so paying for the same.

6. All books shall be returned to the Library for examination at least one week before the Annual Meeting.

7. The Librarian shall have custody of the Publications of the Academy and shall distribute copies among the Associate Fellows and Foreign Honorary Members, at their request. With the advice and consent of the President, he may effect exchanges with other associations.

CHAPTER IX.

OF MEETINGS.

1. There shall be annually four stated meetings of the Academy; namely, on the second Wednesday in May (the Annual Meeting), on the second Wednesday in October, on the second Wednesday in January, and on the second Wednesday in March. At these meetings only, or at meetings adjourned from these and regularly notified, shall appropriations of money be made, or alterations of the statutes or standing votes of the Academy be effected.

2. Fifteen Fellows shall constitute a quorum for the transaction of business at a stated meeting. Seven Fellows shall be sufficient to constitute a meeting for scientific communications and discussions.

3. The Recording Secretary shall notify the meetings of the Academy to each Fellow residing in Boston and the vicinity; and he may cause the meetings to be advertised, whenever he deems such further notice to be needful.

CHAPTER X.

OF THE ELECTION OF FELLOWS AND HONORARY MEMBERS.

1. Elections shall be made by ballot, and only at stated meetings.

2. Candidates for election as Resident Fellows must be proposed by two Resident Fellows of the section to which the proposal is made, in a recommendation signed by them, and this recommendation shall be transmitted to the Corresponding Secretary, and by him referred to the Council for nomination. No person recommended shall be reported by the Council as a candidate for election, unless he shall have received a written approval, signed at a meeting of the Council by at least five of its members. All nominations thus approved shall be read to the Academy at a stated meeting, and shall then stand on the nomination list during the interval between two stated meetings, and until the balloting. No person shall be elected a Resident Fellow, unless he shall have been resident in this Commonwealth one year next preceding his election. If any person elected a Resident Fellow shall neglect for one year to pay his admission fee, his election shall be void; and if any Resident Fellow shall neglect to pay his annual assessments

for two years, provided that his attention shall have been called to this article, he shall be deemed to have abandoned his Fellowship ; but it shall be in the power of the Treasurer, with the consent of the Council, to dispense (*sub silentio*) with the payment both of the admission fee and of the assessments, whenever in any special instance he shall think it advisable so to do.

3. The nomination of Associate Fellows may take place in the manner prescribed in reference to Resident Fellows. The Council may in like manner originate nominations of Associate Fellows, which must be read at a stated meeting previous to the election, and be exposed on the nomination list during the interval.

4. Foreign Honorary Members shall be chosen only after a nomination made at a meeting of the Council, signed at the time by at least seven of its members, and read at a stated meeting previous to that on which the balloting takes place.

5. Three fourths of the ballots cast must be affirmative, and the number of affirmative ballots must amount to eleven to effect an election of Fellows or Foreign Honorary Members.

6. A majority of any section of the Academy is empowered to present lists of persons deemed best qualified to fill vacancies occurring in the number of Foreign Honorary Members or Associate Fellows allotted to it ; and such lists, after being read at a stated meeting, shall be referred to the Council for Nomination.

7. If, in the opinion of a majority of the entire Council, any Fellow — Resident or Associate — shall have rendered himself unworthy of a place in the Academy, the Council shall recommend to the Academy the termination of his Fellowship ; and provided that a majority of two thirds of the Fellows at a stated meeting, consisting of not less than fifty Fellows, shall adopt this recommendation, his name shall be stricken off the roll of Fellows.

CHAPTER XI.

OF AMENDMENTS OF THE STATUTES.

1. All proposed alterations of the Statutes or additions to them, shall be referred to a committee, and, on their report at a subsequent meeting, shall require for enactment a majority of two thirds of the members present, and at least eighteen affirmative votes.

2. Standing votes may be passed, amended, or rescinded, at any

stated meeting, by a majority of two thirds of the members present. They may be suspended by a unanimous vote.

CHAPTER XII.

OF LITERARY PERFORMANCES.

1. The Academy will not express its judgment on literary or scientific memoirs or performances submitted to it, or included in its publications.

STANDING VOTES.

1. Communications of which notice had been given to the Secretary shall take precedence of those not so notified.

2. Resident Fellows who have paid all fees and dues chargeable to them are entitled to receive one copy of each volume or article printed by the Academy, on application to the Librarian personally or by written order, within two years from the date of publication. And the current issues of the Proceedings shall be supplied, when ready for publication, free of charge, to all the Fellows and members of the Academy who desire to receive them.

3. The Committee of Publication shall fix from time to time the price at which the publications of the Academy may be sold. But members may be supplied at half this price with volumes which they are not entitled to receive free, and which are needed to complete their sets.

4. Two hundred extra copies of each paper accepted for publication in the Memoirs or Proceedings of the Academy shall be placed at the disposal of the author, free of charge.

5. Resident Fellows may borrow and have out from the Library six volumes at any one time, and may retain the same for three months, and no longer.

6. Upon special application, and for adequate reasons assigned, the Librarian may permit a larger number of volumes, not exceeding twelve, to be drawn from the Library for a limited period.

7. Works published in numbers, when unbound, shall not be taken from the Hall of the Academy, except by special leave of the Librarian.

8. Books, publications, or apparatus shall be procured from the income of the Rumford Fund only on the certificate of the Rumford Committee that they, in their opinion, will best facilitate and encourage the making of discoveries and improvements which may merit the Rumford Premium.

9. A meeting for receiving and discussing scientific communications may be held on the second Wednesday of each month not appointed for stated meetings, excepting July, August, and September.

RUMFORD PREMIUM.

In conformity with the terms of the gift of Benjamin, Count Rumford, granting a certain fund to the American Academy of Arts and Sciences, and with a decree of the Supreme Judicial Court for carrying into effect the general charitable intent and purpose of Count Rumford, as expressed in his letter of gift, the Academy is empowered to make from the income of said fund, as it now exists, at any Annual Meeting, an award of a gold and a silver medal, being together of the intrinsic value of three hundred dollars, as a premium to the author of any important discovery or useful improvement in light or in heat, which shall have been made and published by printing, or in any way made known to the public, in any part of the continent of America, or any of the American islands; preference being always given to such discoveries as shall, in the opinion of the Academy, tend most to promote the good of mankind; and to add to such medals, as a further premium for such discovery and improvement, if the Academy see fit so to do, a sum of money not exceeding three hundred dollars.

INDEX.

NOTE. For index to the species of *Carex*, see pp. 510-512.

- Acanthophora Thierii, 256.
 Acetabularia crenulata, 247.
 Acetylene Flame, Temperature of the, 88.
 Acompsomyces, 37.
 Corticariae, 37.
 Acrasieae, 334.
 Acrasis, 338.
 granulata, 338.
 Agardhiella tenera, 253.
 Agassiz, A., Albatross Expedition to the Tropical Pacific, 614.
 Alaska, Epidote Crystals from, 529-535, 617.
 Albatross Expedition, 614.
 Algae of Jamaica, 229-270, 614.
 Amansia multifida, 257.
 Americanists, International Congress of, 613, 615.
 Ames, J. B., Biographical Notice of James Bradley Thayer, 628, 679-681.
 Amphiroa charoides, 260.
 debilis, 261.
 fragilissima, 261.
 Anadyomene stellata, 247.
 Antithamnion Butleriae, 258.
 Apatite from Minot, Maine, 515-528, 615, 617.
 Archibald, E. H. See Richards, T. W., and Archibald, E. H.
 Asparagopsis Delilei, 255.
 Assessment, Amount of, 608, 626.
 Atharva Veda, 615.
 Atkinson, E., What Science has not yet accomplished in the Art of War, 618.
 Atomic Hypothesis, A New, 397-411.
 Atomic Volume, The Possible Significance of Changing, 1-17, 397-411, 612.
 Atomic Weight of Copper, 436.
 Atomic Weight of Uranium, 363-395, 615.
 Atomic Weights, Table of, 630; The Standard of, 175-181, 615.
 Avrainvillea longicaulis, 245.
 nigricans, 245.
 Balfour, A. J., elected Foreign Honorary Member, 628.
 Barus, C., Rumford Medal presented to, 614.
 Basquin, O. H., The Arc Spectrum of Hydrogen, 159-174.
 Bizzozero, G., Death of, 599.
 Black, C. W. M., The Parametric Representation of the Neighborhood of a Singular Point of an Analytic Surface, 279-330, 614.
 Blake, C. J., Obituary Notice of J. H. Blake, 612.
 Blake, F., Report of Treasurer (1900-01), 599, (1901-02), 620.
 Blake, J. H., Obituary Notice of, 612.
 Bostrychia Mazei, 257.
 Moritziana var. intermedia, 257.
 tenella, 257.
 Botryophora occidentalis, 247.
 Brunton, L., accepts Membership, 612.
 Bryopsis Harveyana, 244.
 pennata, 244.
 Bryothamnion Seaforthii, 257.
 triangulare, 257.
 Building Fund, 601, 622.
 Cabot, S., Experiments on Forms of Least Resistance to Passage through Air, 618.
 Calhane, D. F. See Jackson, C. L., and Calhane, D. F.
 Callithamnion byssoides var. Jamaicensis, 258.

- Callithamnion corymbosum*, 258.
Caloglossa Leprieurii, 255.
Calothrix aeruginea, 241.
 confervicola, 241.
Calothrix Contarenii, 241.
 fusca, 241.
 Juliana, 241.
 pilosa, 242.
 Carbon, The Visible Radiation from, 71-118, 612.
 Carex. (For index of species, see pp. 510-512.)
 Carices of the Section *Hyparrhenae*, 445-495, 612.
 Carices, Variations of some Boreal, 495-514, 612.
 Case School of Applied Science. See Chemical Laboratory.
Catenella Opuntia var. *pinnata*, 253.
Caulerpa cupressoides var. *ericifolia*, 244.
 cupressoides var. *mamillosa*, 244.
 cupressoides var. *Turneri*, 244.
 cupressoides var. *typica*, 244.
 pinnata forma *Mexicana*, 244.
 plumaris forma *brevipes*, 245.
 plumaris forma *longiseta*, 244.
 prolifera, 245.
 racemosa var. *clavifera*, 245.
 racemosa var. *clavifera* forma *macrophyssa*, 245.
 taxifolia, 245.
 verticillata, 245.
 verticillata forma *charoides*, 245.
Cauloglossum transversarium, 628.
 Celli, A., elected Foreign Honorary Member, 612; accepts Membership, 615.
Ceramium byssoideum, 259.
 clavulatum, 259.
 fastigiatum, 259.
 gracillimum, 259.
 nitens, 259.
 tenuissimum, 259.
 tenuissimum var. *pygmaeum*, 259.
Ceratomyces Braziliensis, 44.
 curvatus, 43.
 Mexicanus, 43.
 procerus, 43.
 spinigerus, 42.
Chaetomorpha aerea, 243.
 brachygonia, 243.
 clavata, 243.
 Linum, 243.
Chaetomorpha Linum var. *brachyarthra*, 243.
 Melagonium, 243.
Chamaedoris annulata, 247.
 Chamberlin, T. C., elected Associate Fellow, 611.
Champia parvula, 255.
Chantransia Saviana, 251.
 Chemical Combination, Probable Source of the Heat of, 397.
 Chemical Laboratory of Harvard College, Contributions from, 175, 271, 345, 363, 397, 413.
 Chemical Laboratory of the Case School of Applied Science, Contributions from, 537, 563.
 Cherbourg, National Soc. of Nat. and Math. Sci., Fiftieth Anniversary, 614, 617.
Chitonomyces Bullardi, 31.
 Hydroperi, 32.
 occultus, 30.
 Orectogyri, 32.
 psittacopsis, 30.
Chlamydomyxa labyrinthuloides, 344.
Chondria Baileyana, 256.
 dasyphylla, 256.
 tenuissima, 256.
 Christiania, Royal University of, The 100th anniversary of birth of N. H. Abel, 620.
Chroococcus turgidus, 239.
Chrootheca Richteriana, 239.
Chrysomenia halymenioides, 255.
Cladophora crystallina, 243.
 fascicularis, 243.
 fuliginosa, 243.
 Hutchinsiae, 243.
 intertexta, 243.
 trichocoma, 244.
 Clifford, H. E., elected Resident Fellow, 616; accepts Fellowship, 620.
 Cocos Island, Flora of, 628.
Codium adhaerens, 246.
 tomentosum, 246.
Cenonia, 342.
 denticulata, 342.
 Collins, F. S., accepts Fellowship, 599; The Algae of Jamaica, 229-270, 614.
Colpomenia sinuosa, 248.
 Committee, Nominating, 617, 619.
 Committees elected, 610, 627; List of, 683.

- Concentrated Solutions, 345.
 Cooke, J. P., Bronze Bas-relief of, 614.
 Corallina capillacea, 261.
 Cubensis, 261.
 pumila, 261.
 rubens, 261.
 subulata, 261.
 Cordylecladia irregularis, 254.
 Peasiae, 255.
 Corethromyces Latonae, 41.
 Stilici, 42.
 Cornu, A., Death of, 620.
 Council, Report of, 620, 635.
 Crew, H., Grant from Income of Rumford Fund to, 623.
 Cross, C. R., President *pro tem.*, 617; Report of the Rumford Committee (1900-01), 601, (1901-02), 623.
 Crouania attenuata, 258.
 Cruoriella Armorica, 260.
 Cryptogamic Laboratory of Harvard University, Contributions from, 19, 331, 612, 628.
 Cryptonemia crenulata, 260.
 Curves, Multiple Points of Twisted, 628.
 Cutleria, 248.
 Cyndrospermum musciola, 240.
 Cymopolia barbata, 247.

 Dante, The Malignity of, 614.
 Dasya arbuscula, 257.
 Gibbesii, 257.
 mucronata, 257.
 Dasycladus clavaeformis, 247.
 Davis, A. McF., Biographical Notice of John Fiske, 620, 665-678.
 Davis, W. M., The Formation of River Terraces, 619.
 Delitzsch, F., elected Foreign Honorary Member, 616; accepts Membership, 618.
 Dibromdinitrobenzols, 629.
 Dicey, A. V., accepts Membership, 613.
 Dichomyces Australiensis, 28.
 Belonuchi, 27.
 bifidus, 26.
 Homalotae, 29.
 Mexicanus, 28.
 Dictothrix penicillata, 242.
 Dictyerpa Jamaicensis, 251.
 Dictyopteris delicatula, 249.
 Justii, 249.
 Dictyopteris plagiogramma, 249.
 Dictyosphaeria favulosa, 247.
 Dictyosteliaceae, 338.
 Dictyostelium, 338.
 aureum, 340.
 brevicaule, 340.
 lacteum, 339.
 mucoroides, 338.
 purpureum, 340.
 roseum, 339.
 sphaerocephalum, 339.
 Dictyota Bartayresiana, 250.
 cervicornis, 250.
 ciliata, 250.
 dentata, 250.
 dichotoma, 250.
 divaricata, 250.
 fasciola, 250.
 Dictyurus occidentalis, 257.
 Digenea simplex, 256.
 Dilophus alternans, 250.
 Guineensis, 250.
 Dinitrobenzolsulphonic Acid, Symmetrical, 629.
 Dioicomyces, 33.
 Anthici, 33.
 onchophorus, 34.
 spinigerus, 34.
 Diplochaete solitaria, 242.
 Diplophrys, 343.
 Archeri, 343.
 stercorea, 344.
 Directive Stimuli, Reactions of Limax maximus to, 183-227.
 Dunkel, O., Regular Singular Points of a System of Homogeneous Linear Differential Equations of the First Order, 628.

 Earle, R. B. See Jackson, C. L., and Earle, R. B.
 Ectocarpus Mitchellae, 248.
 Engler, A., elected Foreign Honorary Member, 611; accepts Membership, 613.
 Enteromorpha erecta, 242.
 flexuosa, 242.
 intestinalis, 242.
 prolifera, 242.
 Epidote Crystals from Alaska, 529-535, 617.
 Eucheuma echinocarpum, 253.
 Euhaplomyces, 25.
 Ancyrophori, 25.
 Xanthophaeae, 26.

- Eumonoicomyces*, 21.
Californicus, 22.
Papuanus, 22.
 Everett, W., *The Malignity of Dante*, 614.
 Farlow, W. G., *Account of the Ninth Jubilee Celebration of the University of Glasgow*, 619.
 Federal Legacy Tax, 599.
 Fellows, Associate, deceased, —
 King, C., 617.
 LeConte, J., 613.
 Rowland, H. A., 599.
 Fellows, Associate, elected, —
 Chamberlin, T. C., 611.
 Fritz, J., 611.
 Pepper, G. W., 613.
 Putnam, H., 618.
 Wilson, E. B., 616.
 Fellows, Associate, List of, 689.
 Fellows, Resident, deceased, —
 Fiske, J., 613.
 Hyatt, A., 617.
 Safford, T. H., 618.
 Thayer, J. B., 618.
 Thayer, J. H., 615.
 Fellows, Resident, elected, —
 Clifford, H. E., 616.
 Hoar, G. F., 611.
 Hofman, H. O., 618.
 Hough, T., 616.
 Jaggar, T. A., Jr., 618.
 Morgan, M. H., 616.
 Porter, W. T., 613.
 Pritchett, H. S., 613.
 Strobel, E. H., 618.
 Williams, F. H., 616.
 Fellows, Resident, List of, 685.
 Fernald, M. L., *The Northeastern Carices of the Section Hyparrhenae*, 445-495, 612; *The Variation of Some Boreal Carices*, 495-514, 612.
 Fiske, A. H. *See* Jackson, C. L., and Fiske, A. H.
 Fiske, J., *Death of*, 613; *Notice of*, 620, 665-678.
 Foreign Honorary Members deceased, —
 Cornu, A., 620.
 Gardiner, S. R., 618.
 Grimm, F. H., 613.
 Kovalevsky, A. O., 615.
 Lacaze-Duthiers, F. J. H., 613.
 Foreign Honorary Members deceased, —
 Nordenskiöld, Friherre A. E., 613.
 Stubbs, W., 599.
 Weinhold, K., 617.
 Foreign Honorary Members elected, —
 Balfour, A. J., 628.
 Celli, A., 612.
 Delitzsch, F., 616.
 Engler, A., 611.
 Gardiner, S. R., 616.
 Hann, J., 616.
 Horsley, V. A. H., 616.
 Lanckester, E. R., 616.
 Lecky, W. E. H., 628.
 Paris, G., 612.
 Richthofen, Freiherr F. von, 611.
 Foreign Honorary Members, List of, 691.
 Forms of Least Resistance to Passage through Air, 618.
 Frandsen, P., *Studies on the Reactions of Limax maximus to Directive Stimuli*, 183-227.
 Fritz, J., *elected Associate Fellow*, 611.
 Fugacity, 54-69.
 Galapagos Flora, *Revision of*, 617.
 Galaxaura cylindrica, 252.
 lapidescens, 252.
 marginata, 252.
 obtusata, 252.
 rugosa, 252.
 Gardiner, S. R., *Death of*, 618; *elected Foreign Honorary Member*, 616; *accepts Membership*, 618.
 Gas-Apparatus, Hempel's, 271-277, 615.
 Gases, Fugacity of Imperfect, 66; at High Temperatures, Spectra of, 619.
 Gelidium coerulescens, 252.
 crinale, 253.
 rigidum, 253.
 supradecompositum, 253.
 General Fund, 600, 621, 625.
 Geotaxis, 190.
 Glasgow, University of, Ninth Jubilee Celebration, 619.
 Gloeocapsa quaternata, 239.
 Gloeotrichia natans, 242.
 Goldstein, A. H. *See* Mabery, C. F., and Goldstein, A. H.

- Goniontia polyrhiza*, 244.
Goniotrichum Humphreyi, 251.
 elegans, 251.
Gracilaria Blodgettii, 253.
 caudata, 253.
 cervicornis, 253.
 compressa, 253.
 confervoides, 253.
 cornea, 253.
 Curtissiae, 253.
 damaecornis, 254.
 divaricata, 254.
 Domingensis, 254.
 ferox, 254.
 multipartita, 254.
 Wrightii, 254.
 Grants, from Income of C. M. Warren Fund, 605, 607, 625, 626; from Income of Rumford Fund, 601, 623, 626.
Grateloupia filicina, 260.
 dichotoma, 260.
 prolongata, 260.
 Gray Herbarium of Harvard University, Contributions from, 445, 612, 617, 628.
 Grimm, F. H., Death of, 613.
Guttulina, 337.
 aurea, 337.
 protea, 337.
 rosea, 337.
 sessilis, 338.
Guttulinaceæ, 335.
Guttulinopsis, 335.
 clavata, 336.
 stipitata, 336.
 vulgaris, 336.
Gymnosorus variegatus, 249.

 Hale, G. E., accepts Fellowship, 612; Grant from Income of Rumford Fund to, 601; Radiometer, 601; Rumford Premium awarded to, 624, 628.
Halimeda Opuntia, 246.
 tridens, 246.
 Tuna, 246.
Halodictyon mirabile, 258.
Haloplegma Duperryi, 258.
Halymenia Floresia, 260.
 Hann, J., elected Foreign Honorary Member, 616; accepts Membership, 618.
Haplosiphon fontinalis, 241.

 Harvard College. See Chemical Laboratory, Cryptogamic Laboratory, Gray Herbarium, and Zoological Laboratory.
 Harvard Mineralogical Museum, Contributions from, 515, 529.
 Heat of Chemical Combination, Probable Source of, 397-411, 617.
 Heat of Vaporization, 537-549, 618.
 Heimrod, G. W. See Richards, T. W., and Heimrod, G. W.
 Hempel's Gas-Apparatus, Modifications of, 271.
 Herty, C. H., Grant from C. M. Warren Fund to, 605, 607.
Heterosiphonia Wurdemannii, 257.
 Higginson, T. W., Biographical Notice of Horace Elisha Scudder, 619, 657-661.
Hildenbrandtia prototypus, 260.
 Hoar, G. F., elected Resident Fellow, 611.
 Hofman, H. O., elected Resident Fellow, 618; accepts Fellowship, 620; Grant from Income of C. M. Warren Fund to, 625, 626.
Hormothamnion enteromorphoides, 241.
 Horsley, V. A. H., elected Foreign Honorary Member, 616; accepts Membership, 618.
 Hough, T., elected Resident Fellow, 616; accepts Fellowship, 617.
 Hudson, J. E., Obituary Notice of, 612.
 Hyatt A., Death of, 617; Notice of, 628.
Hydrocarbons in Pennsylvania Petroleum, 563-595, 620.
Hydrocarbons, Paraffine and Methylenes, 537-549, 618.
Hydroclathrus cancellatus, 248.
 Hydrogen, Arc Spectrum of, 159-174.
Hyparrhenae, Carices of the Section, 445-495.
Hypnea, divaricata, 254.
 musciformis, 254.
 Valentiae, 254.

 Iron, Arc Spectrum of, 628.

 Jackson, C. L., Report of the C. M. Warren Committee (1900-01), 605, (1901-02), 625.

- Jackson, C. L., and Calhane, D. F.,
On the Dibromdinitrobenzols
derived from Paradibromben-
zol, 629.
- Jackson, C. L., and Earle, R. B., On
certain Derivatives of Picric Acid,
629; On Symmetrical Dinitro-
benzolsulphonic Acid, 629; On
the Colored Substances derived
from Nitro-compounds, 629.
- Jackson, C. L., and Fiske, A. H.,
On certain Derivatives of 1, 2,
3-Tribrombenzol, 629.
- Jackson, H., Foreign Honorary Mem-
ber, 613.
- Jaggar, T. A., Jr., elected Resident
Fellow, 618; accepts Fellowship,
620.
- Jamaica, Algae of, 229-270.
- Johnston, J. R., On *Cauloglossum*
transversarium (Bosc) Fries, 628.
- Kainomyces*, 44.
Isomali, 45.
- Keen, W. W., accepts Fellowship,
612.
- King, C., Death of, 617.
- Koch, R., accepts Membership, 613.
- Kovalevsky, A. O., Death of, 615.
- Laboulbeniaceae*, Preliminary Diag-
noses of New Species of, 19-45,
612, 628.
- Labyrinthula*, 343.
Cienkowski, 343.
macrocystis, 343.
vitellina, 343.
- Labyrinthulaceae*, 342.
- Lacaze-Duthiers, F. J. H. de, Death
of, 613.
- Lankester, E. R., elected Foreign
Honorary Member, 616; accepts
Membership, 618.
- Lanman, C. R., The *Atharva Veda*
and its Significance for the His-
tory of Hindu Tradition and
Hindu Medicine, 615.
- Laurencia cervicornis*, 255.
implicata, 255.
obtusa, 255.
papillosa, 255.
perforata, 256.
tuberculosa var. *gemmaifera*, 256.
- Lecky, W. E. H., elected Foreign
Honorary Member, 628.
- LeConte, J., Death of, 613.
- Legacy Tax, Federal, 599.
- Lewis, G. N., The Law of Physico-
chemical Change, 47-69.
- Liagora Cheyneana*, 251.
decussata, 252.
elongata, 252.
pulverulenta, 252.
valida, 252.
- Librarian, Report of, 606, 622.
- Library, Appropriations for, 607.
- Library, Committee on the, Report
of, 606.
- Limax maximus*, Reactions of, 183-
227.
- Lithothamnion incrustans*, 260.
Lenormandi, 260.
- Loci in *n*-Fold Space, On Ruled, 119-
157, 612.
- Lophosiphonia obscura*, 257.
- Lowell, A., Notice of, 614, 635-654.
- Lowell, A. L., Party Votes in Par-
liament, Congress, and the State
Legislatures, 617.
- Lowell, P., Biographical Notice of
Augustus Lowell, 614, 635-654;
Some Results from the Last
Opposition of Mars, 615.
- Lyman, T., accepts Fellowship, 612.
- Lyngbya aestuarii*, 240.
confervoides forma violacea, 240.
majuscula, 240.
putalis, 240.
versicolor, 240.
- Mabery, C. F., Grant from Income
of C. M. Warren Fund to, 605,
607, 625, 626; On the Hydrocar-
bons in Pennsylvania Petroleum
with Boiling Points above 216°,
620, 563-595.
- Mabery, C. F., and Goldstein, A. H.,
On the Specific Heats and Heat
of Vaporization of the Paraffine
and Methylene Hydrocarbons,
537-549, 618.
- MacDonald, A., Psycho-Physical Lab-
oratory, 599.
- Magnesium, Arc Spectrum of, 628.
- Mall, F. P., accepts Fellowship, 599.
- Manchioneal, 255.
- Mark, E. L. See Zoological Labor-
atory etc., Contributions from.
- Markovnikoff, V., 599.
- Mars, Last Opposition of, 615.

- Mastiek, S. C., Federal Legacy Tax, 599.
- Mastigocoleus testarum, 241.
- Melobesia farinosa, 260.
 Lejolisii, 260.
 membranacea, 260.
 pustulata, 260.
- Mendenhall, C. E., Bolometer, 601;
 Grant from Income of Rumford Fund to, 601.
- Mendenhall, T. C., Associate Fellow, 616.
- Mercurous Chloride, The Decomposition of, 345-361, 615.
- Merigold, B. S. *See* Richards, T. W., and Merigold, B. S.
- Messedaglia, A., Death of, 599.
- Microcoleus chthonoplastes, 240.
 tenerrimus, 240.
 vaginatus, 240.
- Microdictyon umbilicatum, 247.
- Minot, Maine, Apatite from, 515-528, 615, 617.
- Mislawsky, A., Fiftieth Anniversary, 614.
- Monoicomyces, 23.
 Aleocharae, 24.
 Echidnoglossae, 23.
 furcillatus, 24.
- Moore, E. H., accepts Fellowship, 612.
- Moreno, H. C., On Ruled Loci in n -Fold Space, 119-157, 612.
- Morgan, M. H., elected Resident Fellow, 616, 617.
- Müller-Breslau, H., accepts Membership, 613.
- Murrayella pericladus, 257.
- Museum of Comparative Zoology.
 See Zoological Laboratory.
- Mycoidea parasitica, 243.
- Neighborhood of a Singular Point, 279.
- Neomeris dumetosa, 247.
- Nichols, E. F., Grant from Income of Rumford Fund to, 623.
- Nichols, E. L., The Visible Radiation from Carbon, 71-118, 612.
- Nitro-compounds. Colored Substances derived from, 629.
- Nobel Committee, Nobel Prize, 614.
- Nordenskiöld, Friherre A. E., Death of, 613.
- Nostoc commune, 240.
- Nostoc microscopicum, 240.
 verrucosum, 240.
- Noyes, A. A., Electrical Conductivity, 602; Grant from Income of C. M. Warren Fund to, 605, 607, 625, 626; Grant from Income of Rumford Fund to, 602, 623.
- Nuremberg, Natural History Society of, One hundredth Anniversary, 613.
- Officers elected, 610, 618, 626; List of, 683.
- Olive, E. W., A Preliminary Enumeration of the Sorophorae, 331-344.
- Ophthalmological Hospital, 599.
- Oppenheimer, A., Certain Sense Organs of the Proboscis of the Polychaetous Annelid Rhynchobolus dibranchiatus, 551-562.
- Oscillatoria anguina, 239.
 Corallinae, 239.
 formosa, 239.
 princeps, 239.
 princeps forma purpurea, 239.
 proboscidea, 239.
 tenuis, 239.
- Oxford, University of, 300th Anniversary Bodleian Library, 620.
- Packard, A. S., Biographical Notice of Alpheus Hyatt, 628.
- Padina Durvillaei, 249.
- Palache, C., A Description of Epidote Crystals from Alaska, 529-535, 617.
- Palache, C. *See* Wolff, J. E., and Palache, C.
- Paraffine and Methylene Hydrocarbons, Specific Heat of, 537-549, 618.
- Parametric Representation of the Neighborhood of a Singular Point, 279-330, 614.
- Paris, G., elected Foreign Honorary Member, 612; accepts Membership, 613.
- Penicillus capitatus, 245.
 dumetosus, 245.
- Pennsylvania Petroleum, Hydrocarbons in, 563.
- Pepper, G. W., elected Associate Fellow, 613; accepts Fellowship, 614.

- Petroleum, Composition of, 563-595, 620.
- Peyritschella Xanthopygi, 29.
- Peysonnellia Dubyi, 260.
rubra, 260.
- Phormidium Retzii, 239.
- Phototaxis, 206.
- Physico-chemical Change, The Law of, 47-69.
- Pickering, E. C., Co-operation in Administering Research Funds, 602.
- Picric Acid, Derivatives of, 629.
- Pissaroff, V., Ophthalmological Hospital, 599.
- Plectonema Nostocorum, 240.
Wollei, 240.
- Plowman, A. B., On the Ionization of Soils, 628.
- Poincaré, H., accepts Membership, 613.
- Points, Multiple, 628.
- Points, Regular Singular, 628.
- Polysiphonia cuspidata, 256.
ferulacea, 256.
Havanensis, 256.
Havanensis var. Binneyi, 256.
Pecten-Veneris, 256.
secunda, 256.
subulata, 256.
- Polysphondylium, 341.
album, 342.
pallidum, 341.
violaceum, 341.
- Porter, R. A., The Influence of Atmospheres of Nitrogen and Hydrogen on the Arc Spectra of Iron, Zinc, Magnesium and Tin, compared with the Influence of an Atmosphere of Ammonia, 628.
- Porter, W. T., elected Resident Fellow, 613; accepts Fellowship, 614.
- Pringsheimia scutata, 243.
- Pritchett, H. S., elected Resident Fellow, 613.
- Psycho-Physical Laboratory, 599.
- Publication, Committee of, Report of, 605, 625.
- Publications, Appropriations for, 607, 626.
- Putnam, F. W., Archaeological Work of J. H. Blake, 612.
- Putnam, H., Delegate to Bodleian Library Commemoration, 620; elected Associate Fellow, 618; accepts Fellowship, 620.
- Radiation from Carbon, The Visible, 71-118, 612.
- Records of Meetings, 599-628.
- Rhacomyces Dolicaontis, 39.
Glyptomeri, 39.
Oedichiri, 38.
- Rhipocephalus Phoenix, 245.
- Rhynchobolus dibranchiatus, 551-562.
- Richards, T. W., Grant from Income of Rumford Fund to, 602, 624, 626; Modifications of Hempel's Gas-Apparatus, 271-277, 615; Table of Atomic Weights, 630; The Possible Significance of Changing Atomic Volume, 1-17, 397-411, 612; The Probable Source of the Heat of Chemical Combination, and a New Atomic Hypothesis, 397-411, 617; The Standard of Atomic Weights, 175-181, 615; Thomson-Joule Experiment, 602, 624.
- Richards, T. W., and Archibald, E. H., The Decomposition of Mercurous Chloride by Dissolved Chlorides: a Contribution to the Study of Concentrated Solutions, 345-361, 615.
- Richards, T. W., and Heimrod, G. W., On the Accuracy of the Improved Voltmeter, 413-443.
- Richards, T. W., and Merigold, B. S., A new Investigation concerning the Atomic Weight of Uranium, 363-395, 615.
- Richthofen, F. Freiherr von., elected Foreign Honorary Member, 611; accepts Membership, 613.
- River Terraces, 619.
- Robinson, B. L., Diagnoses and Synonymy of some Mexican Spermatophytes, 628; Flora of Cocos Island of the Pacific, 628; Revision of the Galapagos Flora, 617.
- Rotch, A. L., Report of Librarian, 606, 622.
- Rowland, H. A., Death of, 599.
- Rumford Committee, Report of (1900-01), 601, (1901-02), 623.

- Rumford Fund, 600, 621; Appropriations from Income of, 607, 624, 626; Papers published by Aid of, 71, 159, 397.
- Rumford Medals, Presentation of, 614; Replicas, 602, 607.
- Rumford Premium, 703; Awards of, 604 (Complete List from 1839 to 1900 inclusive), 607, 624, 628.
- Safford, T. H., Death of, 613; Notice of, 654-656.
- Sappinia, 335.
 pedata, 335.
- Sappiniaceae, 334.
- Sargassum *bacciferum*, 248.
 lendigerum, 248.
 platycarpum, 248.
 vulgare, 248.
 vulgare forma ovata, 248.
 vulgare var. foliosissimum, 249.
- Schizothrix *coriacea*, 240.
 Mexicana, 240.
- Scudder, H. E., Notice of, 619, 657-661.
- Scudder, S. H., Report of Committee of Publication (1900-01), 605, (1901-02), 625.
- Scytonema *Arcangelii*, 241.
 conchophilum, 241.
 crispum, 241.
 densum, 241.
 Hofmanni, 241.
 Javanicum, 241.
 ocellatum, 241.
- Searle, A., Biographical Notice of Truman Henry Safford, 654-656.
- Sedgwick, W. T., and Winslow, C. E. A., Experiments on the Effect of Freezing and other Low Temperatures upon the Viability of the *Bacillus* of Typhoid Fever, with Considerations regarding Ice as a Vehicle of Infectious Disease, 619; Statistical Studies on the Seasonal Prevalence of Typhoid Fever in Various Countries and its Relation to Seasonal Temperature, 619.
- Sense Organs of the Proboscis of *Rhynchobolus*, 551-562.
- Silver, Electrochemical Equivalent of, 438.
- Siphonocladus *membranaceus*, 247.
 tropicus, 247.
- Soils, Ionization of, 628.
- Solieria chordalis*, 253.
- Solutions, Concentrated, 345-361.
- Sorophorae, A Preliminary Enumeration of the, 331-344.
- Spatoglossum *Schroederi*, 249.
- Specific Heat of Hydrocarbons, 537-549.
- Spectra, Arc, of Iron, Zinc, Magnesium and Tin, 628.
- Spectra of Gases, 619.
- Spectrophotometer, 87.
- Spectrophotometric Observations, 103.
- Spectrum of Hydrogen, The Arc, 159-174.
- Spermatophytes, Diagnoses and Synonymy of some Mexican, 628.
- Spermothamnion *Gorgoneum*, 258.
 Turneri var. variabile, 258.
- Sphaleromyces Chiriquensis*, 40.
 Indicus, 41.
 Quedionuchi, 39.
- Spirogyra decimina*, 242.
- Spyridia aculeata*, 259.
 filamentosa, 259.
- Standing Committees appointed, 611, 627.
- Standing Votes, Amendment of, 619.
- Statutes, Amendments of the, 608, 616.
- Statutes and Standing Votes, 693.
- Stichomyces*, 37.
 Conosomae, 38.
- Stigeoclonium tenue*, 242.
- Striaria attenuata*, 248.
 attenuata var. ramosissima, 248.
- Strobel, E. H., elected Resident Fellow, 618; accepts Fellowship, 620.
- Stubbs, W., Death of, 599.
- Stypopodium lobatum*, 249.
- Swain, G. F., Secretary *pro tem*, 615.
- Symploca hydroides var. genuina*, 240.
 hydroides var. fasciculata, 240.
- Teratomyces insignis*, 36.
 petiolatus, 36.
 Zealandica, 35.
- Thaxter, R., Preliminary Diagnoses of New Species of *Laboulbeniaceae*, IV., 19-45, 612; V., 628.

- Thayer, J. B., Death of, 618; Notice of, 628, 679-681; Obituary Notice of John E. Hudson, 612.
- Thayer, J. H., Death of, 615; Notice of, 619, 661-664.
- Thigmotaxis, 187.
- Thomson, E., Rumford Medal presented to, 614; Rumford Premium awarded to, 607.
- Tin, Arc Spectrum of, 628.
- Toy, C. H., Biographical Notice of Joseph Henry Thayer, 619, 661-664.
- Treasurer, Annual Report of (1900-01), 599, (1901-02), 620.
- Tribrombenzol, 629.
- Trowbridge, J., The Spectra of Gases at High Temperatures, 619.
- Turbinaria trialata, 248.
- Typhoid Fever, 619.
- Udotea conglutinata, 246.
flabellata, 246.
- Ulva fasciata, 242.
Lactuca var. rigida, 242.
- Uranium, Atomic Weight of, 363-395.
- Valonia aegagropila, 246.
ventricosa, 246.
verticillata, 247.
- Van der Vries, J. N., On the Multiple Points of Twisted Curves, 628.
- Voltmeter, Accuracy of the Improved, 413-443.
- Vries, J. N. Van der. *See* Van der Vries, J. N.
- Walcott, H. P., elected Vice-President, 618, 620.
- War, Art of, 618.
- Warren (C. M.) Committee, Report of (1900-01), 605, (1901-02), 625.
- Warren (C. M.) Fund, 601, 622; Appropriations from Income of, 607, 626; Paper published by Aid of, 563.
- Webster, A. G., Grant from Income of Rumford Fund to, 623.
- Weinhold, K., Death of, 617.
- Whitman, C. O., accepts Fellowship, 612.
- Williams, F. H., elected Resident Fellow, 616.
- Wilson, E. B., elected Associate Fellow, 616; accepts Fellowship, 617.
- Winslow, C.-E. A. *See* Sedgwick, W. T., and Winslow, C.-E. A.
- Wolff, J. E., and Palache, C., Apatite from Minot, Maine, 515-528, 615, 617.
- Wood, R. W., Grant from Income of Rumford Fund to, 623.
- Wrangelia Argus, 252.
- Xenococcus Schousboei, 239.
- Yale University, Two-hundredth Anniversary, 613.
- Zinc, Arc Spectrum of, 628.
- Zoölogical Laboratory of the Museum of Comparative Zoölogy at Harvard College, Contributions from, 183, 551.





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A TABLE OF ATOMIC WEIGHTS. BY THEODORE WILLIAM RICHARDS.

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OFFICERS AND COMMITTEES FOR 1901-1902.

LIST OF THE FELLOWS AND FOREIGN HONORARY MEMBERS.

STATUTES AND STANDING VOTES.

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INDEX.

(TITLE PAGE AND TABLE OF CONTENTS.)

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